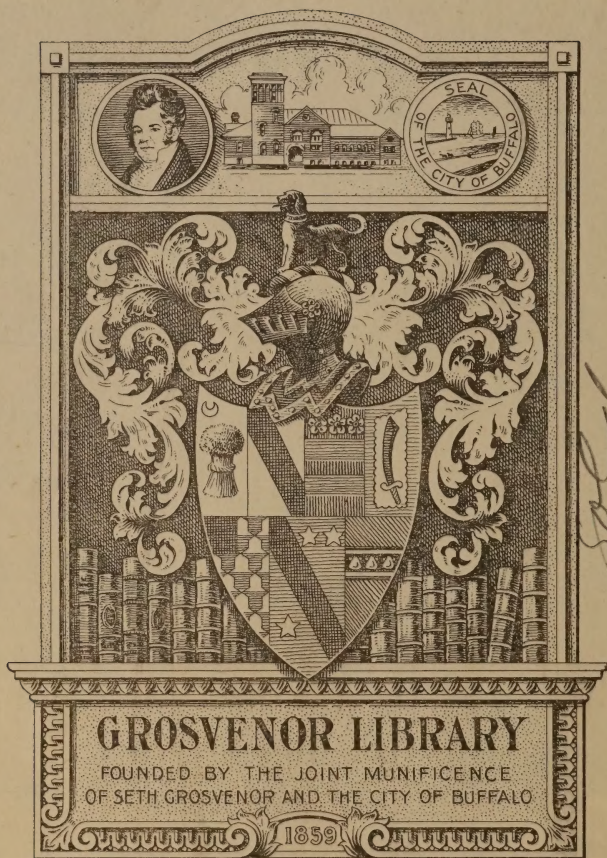


JUBILEE

OF THE DISCOVERY
OF MAUVE AND OF
THE FOUNDATION
OF THE COAL-TAR
COLOUR INDUSTRY
BY SIR W. H. PERKIN,

F.R.S., D.Sc., LL.D., Ph.D., Dr.Ing.

CO
W. Coblenz.

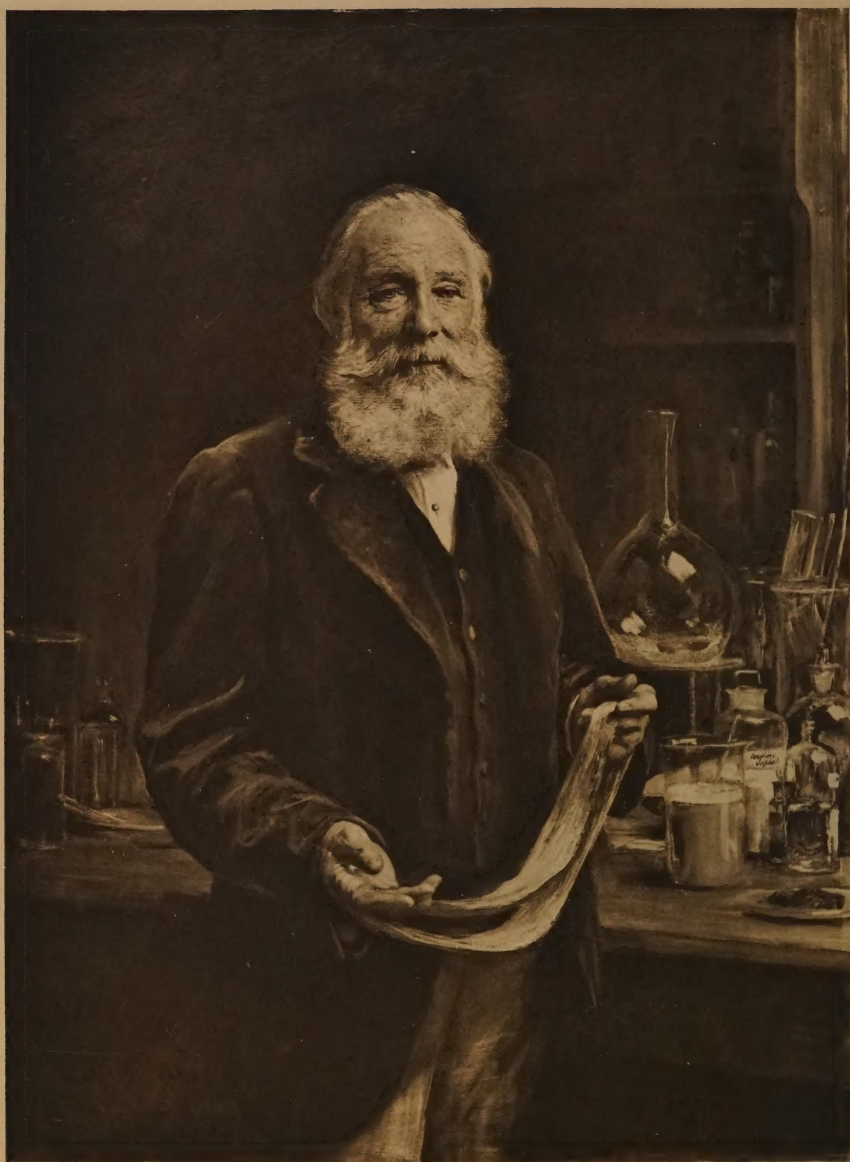




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Sir William H. Perkin, F.R.S.
after the painting by A. S. Cooper, R.A.

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Edited by

RAPHAEL MELDOLA, F.R.S.,

Chairman of the Executive Committee.

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Assistant Honorary Secretary.

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THE FOUNDATION OF

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THE COAL-TAR COLOR INDUSTRY BY

SIR W. H. PERKIN

MRS. D. L. L. D.

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1875

RATONAL POLYMER, N. B.

1875

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1875

1875

THE COAL-TAR COLOR INDUSTRY BY

SIR W. H. PERKIN

PREFACE.

In preparing this account of the Proceedings in connexion with the International Celebration of the Coal-Tar Colour Jubilee, the Editors have added to the special report by *The Times* the whole of the telegrams, letters, and addresses which were received by Sir William Henry Perkin during the progress of the meeting. In addition, several of the speeches made at the Royal Institution and at the Dinner at the Hôtel Métropole are here for the first time published *in extenso*.

The report of the celebrations held in America is compiled from particulars published in the *Textile Manufacturer's Journal* of October 13th, 1906, and from other sources.

The reproductions of the portraits of Sir W. H. Perkin and of his father and brother, the views of the Greenford Green Works, and the photographs of the oil portrait and marble bust presented to Sir W. H. Perkin by international subscription, will, it is hoped, give an added interest to the *brochure* here presented.

RAPHAEL MELDOLA, Chairman, Executive Committee.

ARTHUR G. GREEN, Hon. Secretary.

JOHN C. CAIN, Assistant Hon. Secretary.

Dedicated

TO

SIR WILLIAM HENRY PERKIN,

D.Sc., Ph.D., LL.D., F.R.S.



*A crown of Fame ! Fulfilment of thy work well done,
And knowledge of a people's gratefulness ;
The promise of life's purpose, fully wrought and won,
And glorified by its great usefulness.*

*Science has set her seal and signet on thy brow,
And thou hast prized her gifts from Heaven sent ;
What better recompense could be accepted now
Than the sweet knowledge of a life well spent ?*

*To great ends and projects has thy life been given ;
Right well and nobly has the goal been won ;
For this, O Great Discoverer, thou hast striven ;
Take, then, our thanks, for all that thou hast done.*

*Mankind usurps in thy great heart so large a place,
The best praise we can offer is too small,
But yet receive, for all that thou hast given thy race,
Sincere acknowledgment from one and all.*

*The nations gather here to meet and greet thee,
With true sincerity and leal regard :
So proudly, gladly honour this thy Jubilee,
With full appreciation for thy just reward !*

NORA HASTINGS.

INTERNATIONAL CELEBRATION

OF THE

COAL-TAR COLOUR JUBILEE.

MEETING AT THE ROYAL INSTITUTION.

At the meeting which was held in the theatre of the Royal Institution, Albemarle-street, Piccadilly, on Thursday, July 26th, 1906, the chair was taken by PROFESSOR R. MELDOLA, F.R.S. SIR WILLIAM H. PERKIN, on his appearance, was received with loud and prolonged cheers. There was a large attendance of representatives of scientific societies and of commercial organizations interested in the Coal-Tar Colour industry. A great many ladies were also present.

The CHAIRMAN, in opening the proceedings, said:—My lords, ladies and gentlemen,—The object for which we are assembled on the present occasion is so well known to most of you that, in view of the long programme before us, I do not propose to occupy your attention myself for more than a very few moments. It will, I am sure, be your wish, in the first place, that we should take this opportunity of offering our hearty congratulations to the founder of the Coal-Tar Colour industry on having lived to witness the consummation of his labours, which we are celebrating on this 50th anniversary. (Cheers.) And, in offering him our best congratulations, we add the hearty wish that he may yet be spared for many years to continue those brilliant researches with which his name has become associated during the later period of his life. Also, it is a matter of congratulation that we are enabled to refer to the recent mark of distinction which he has received at the hands of our King. (Cheers.) That the occasion which has drawn us together is an important one is sufficiently borne witness to by the brilliant gathering which has assembled in this theatre. No more appropriate meeting-ground could possibly be found anywhere in the British Islands than this classic home, in which Michael Faraday first discovered the hydrocarbon benzene, as we now call it. And here on the table is the original specimen of benzene discovered by Michael Faraday in the year 1825. That the occasion is a great one appears also from the very distinguished muster of our foreign colleagues whom we have the honour of welcoming here. (Cheers.) I have the pleasure of

announcing that we have among us, as the representative of America, Dr. Leo Baekeland; as the representative of Austria, Professor Paul Friedländer; as the representative of Belgium, M. Destrée; as the representatives of France, M. Étard, Professor Haller, and M. Guyot. From Germany we welcome Professor Emil Fischer, president of the German Chemical Society; Professor Bernthsen, Dr. H. Caro, and Dr. Ehrhardt (Badische Anilin und Soda-Fabrik); Dr. Aug. Clemm, Herr R. Bablich, Dr. M. Liebert, Dr. Albrecht Schmidt, Herr A. de Ridder, and Dr. E. Ullrich (Farbwerke, Meister, Lucius, and Brüning); Dr. Klingemann (Cassella and Co.), Professor Lepsius (Chemische Fabrik, Griesheim), Professor Kraemer, Professor Delbrück, Professor Möhlau, Dr. Raschig, Dr. W. Kalle (Kalle and Co., Biebrich), Dr. Weiskopf, Professor Gustav Schultz, Professor Dr. Carl Duisberg, and Dr. Nieme (Farbenfabriken, Elberfeld), Professor Liebermann, Professor H. Erdmann. From Holland we welcome Professor P. van Romburgh, from America Professor Orndorff, and from Switzerland Professor Hans Rupe. My lords, ladies and gentlemen,—It is merely my pleasant duty now to ask you to extend to our distinguished foreign visitors the hand of friendship and welcome. (Cheers.) And now a word or two with regard to the movement which, as I have said, to-day finds its consummation. The meeting which was held last February at the Mansion-house, under the auspices of the Lord Mayor, launched a scheme which had for its purpose the carrying out of three objects:—First, the painting of a portrait in oils of Sir William Henry Perkin; secondly, the execution of a bust of Sir William; and, thirdly, the presentation of the remainder of the fund for the endowment of chemical research in the name of Sir William Henry Perkin, the fund to be administered through the Chemical Society of London. (Hear, hear.) I am happy to be able to inform you that all these objects have been fulfilled; and in the first place it is my pleasing duty, on behalf of the subscribers, to present this portrait of Sir William Perkin, which has been painted by Mr. A. S. Cope, A.R.A. (The portrait was here unveiled amid cheers.)

Continuing, the CHAIRMAN said:—In asking Sir William Perkin to accept this portrait, coupled with the condition which you are all aware of, that it is ultimately to become the property of the nation (cheers), I can only add that it is the most sincere and earnest wish of all of us that the portrait will remain in his possession for a very long number of years to come. (Cheers.) The next part of our programme was the execution of a bust by Mr. Pomeroy, A.R.A., and I have now the pleasure of directing your attention to a cast of it. The original marble bust will be placed in the library of the Chemical Society, where it will act, we feel sure, as a brilliant reminder of the long association of Sir William Perkin with our society, and as a sign of encouragement to all future generations of chemical workers in this country. (Cheers.) With respect to the fund, we are at present unable to make any precise statement, as all the subscriptions have not yet come in; but with regard to the English subscriptions, we can say that we have a sum of something over £2,000. (Cheers.) The subscriptions from all the foreign countries have not yet been formally handed over. That is a matter of detail we need not enter into on the present occasion. We have, of course, received a great number of letters and telegrams of congratulation, and of regret for inability to attend. I will ask the honorary secretary, Professor Green, to be good enough to make known the contents of some of these messages.

SIR WILLIAM PERKIN said:—

Gentlemen, I feel great difficulty in expressing all I would like to say on this occasion, especially after the very kind remarks your chairman has made. I heartily thank all connected with this Jubilee Celebration for what they are doing to honour me on this occasion, and I cannot say how much I value the gift of my portrait, painted by such a distinguished artist as Mr. A. S. Cope, and I am sure it will also



*Sir William Henry Perkin F.R.S.
Bust by Pomeroy presented to the Chemical Society.*

be greatly prized by my family and friends and will add much interest to my home. We are also all proud to know that it is to eventually become the property of the nation. I look upon this portrait as a very special part my countrymen have taken in reference to the Jubilee of the Coal-Tar Colour Industry. This is by no means the first time that my fellow-countrymen have conferred honours upon me. Some of the Universities and learned societies have on previous occasions done this in recognition of my scientific and technical work. But this gift to-day is certainly the crowning one, and I thank you all most sincerely for the kindly and generous feeling of which this portrait is the evidence.

PROFESSOR A. G. GREEN (University of Leeds) then read a number of letters and telegrams of a congratulatory nature.

(From GEHEIMRATH DR. H. T. BÖTTINGER, Director der Farbenfabriken, Elberfeld.)

“Chairman, Perkin Jubilee. Kindly convey to your illustrious gathering my particular and most sincere regrets that circumstances hinder me from participating in your Jubilee. Please rest assured that in spirit and mind I am most heartily and sincerely with you, and that I cordially unite my wishes with those of your meeting for Sir William Perkin personally and for the further development of the especial science and its industrial application emanating from him.—Very truly and faithfully, Geheimrath Dr. Böttinger.”

(From GEHEIMRATH PROF. DR. OTTO N. WITT, Technische Hochschule, Berlin.)

“Impossible to attend Jubilee; wishing you all success, Witt.”

(From PROF. DR. GEORG LUNGE, Zurich.)

“Cordial congratulations to the founder of the aniline dye industry.—Lunge.”

(From GEHEIMRATH PROF. DR. F. BEILSTEIN, St. Petersburg.)

“Ein Hoch dem mütigen Begründer einer Weltindustrie, dem rastlosen Förderer der Wissenschaft, höchst seltenes Beispiel aber glänzender Beweis der nahen Verwandtschaft von Theorie und Praxis.—Beilstein.”

(From GEHEIMRATH PROF. DR. TH. CURTIUS, Universität, Heidelberg.)

“Dem Dr. Honoris Causa Philosophiæ Naturalis der Universität Heidelberg, dem berühmten Forscher und Gelehrten sendet herzliche Glückwünsche zum heutigen Tage Theodor Curtius, Heidelberg.”

(From GEHEIMRATH PROF. DR. E. BECKMANN, Leipzig.)

“Dem Begründer der Teerfarbenindustrie sendet zum fünfzig jährigen Jubiläum der Entdeckung des ersten Anilinfarbstoffes verehrungsvolle Glückwünsche die chemische Gesellschaft zu Leipzig im Auftrage Professor Beckmann zur Zeit Vorsitzender.”

(From PROF. CIAMICIAN, University, Bologna.)

“Dolente non poter essere presente. Pregola rappresentarmi festa giubilare illustre autore gloriosa scoperta fondamento industria organica.—Ciamician.”

(From PROF. KÖRNER, Milan.)

“Dr. Perkin, F.R.S., Società chimiche Milano, Roma, Torino presenteranno speciale pergamena per onorare anniversario scoperta mauveina intanto mando cordiale saluto votato società chimica Milano, di chi ho l'onore essere presidente con l'espressione di sincera ammirazione e con auguri che la vostra vita duri ancor

lungamente à beneficio della scienza e dell' industria chimica, che per una delle sue parti più importante deve à voi il suo gigantesco sviluppo.—Prof. Körner."

(From PROFESSORS ANDERLINI, PELLINI, LEVI, BRINGHETTI, ANGELI, Italy.)

"Istitute chimico Padova invia felicitazioni auguri al fondatore industria colori catrame.—Anderlini, Pellini, Levi, Bringhetti, Angeli."

(From PROFESSORS CANNIZZARO and PATERNO, University of Rome.)

"La società chimica di Roma nel giorno solenne in cui si festeggia il cinquantesimo anniversario della feconda scoperta della mauveina invia all' illustre scopitore omaggi e fervidi auguri i Presidenti Cannizzaro, Paterno."

(From PROFESSOR GAREMPORA, Naples.)

"I chimici di Napoli mandano allo scopitore della mauveina i loro auguri nella cinquantesima ricorrenza della memorabile data. Garempora."

(From PROFESSOR JORGENSEN, Copenhagen.)

"Dr. W. H. Perkin,—The most cordial and respectful congratulations from the Chemical Society in Copenhagen."

(From PROF. ARTHUR SCHUSTER, University of Manchester.)

"Hearty congratulations on the Jubilee celebrations of your memorable discovery and on his Majesty's recognition of your scientific work.—Arthur Schuster and Laboratory."

PROFESSOR EMIL FISCHER then presented to Sir William Perkin the Hofmann Medal awarded by the

GERMAN CHEMICAL SOCIETY.

He said :—

An dem Tage, wo die Chemiker aller Nationen Ihnen Huldigungen darbringen, darf die deutsche chemische Gesellschaft, die seit zwei Jahrzehnten mit Stolz Ihren Namen auf der Liste der Ehrenmitglieder führt, unter den Glückwünschenden nicht fehlen. Als derzeitiger Präsident der Gesellschaft habe ich die Freude, Ihnen die herzlichen Sympathieen, die im weiten Kreise der deutschen Chemiker für Sie bestehen, zum Ausdruck zu bringen und Ihnen zu sagen, wie hoch wir Ihr Verdienst um die Förderung unserer Wissenschaft und um die Begründung eines neuen Zweiges der chemischen Industrie schätzen. Es war wahrhaftig vor einem halben Jahrhundert ein kühnes Unternehmen für den 18 jährigen Jüngling, eine glückliche wissenschaftliche Beobachtung mit richtiger Erkenntnis ihres praktischen Wertes in den Fabrikbetrieb zu übertragen und damit eine neue eigenartige Technik zu schaffen, deren prachtvolle Kinder alsbald das Erstaunen und das Entzücken aller farbenfrohen Menschen erweckten. Aber noch grösseren Anlass zur Bewunderung gaben Sie Ihren Fachgenossen, als Sie nach 20 Jahren angestrenzter und erfolgreicher technischer Arbeit zur reinen Wissenschaft zurückkehrten und sie alsbald mit jener fruchtbaren Methode beschenkten, die in Ihrer Synthese des Cumarins wurzelt und als "Perkin'sche Reaktion" jedem organischen Chemiker wohl bekannt ist. Auch dieser Erfolg konnte Ihrem erfinderischen Genie nur vorübergehend Befriedigung gewähren. Ihr leicht beweglicher Geist führte Sie bald aus den gewöhnlichen Bahnen der organischen Synthese hinaus und Ihr Interesse wandte sich dem weniger bebauten Grenzgebiet zwischen Chemie und Physik zu. In der von Ihrem grossen Landsmann Faraday entdeckten elektromagnetischen Rotation erkannten Sie eine neue wichtige Constante der organischen Verbindungen und schufen nun in jahrzehntelanger unermüdlicher Arbeit durch zahllose Messungen mit verbesserten Apparaten ein wertvolles neues Hilfsmittel für die Lösung strukturechemischer Probleme. Für alle diese ausgezeichneten Leistungen auf dem Gebiete der organischen Chemie hat der

Vorstand unserer Gesellschaft beschlossen, Ihnen die höchste Auszeichnung, die er verleihen kann, zu Theil werden zu lassen, und ich bin beauftragt Ihnen heute die zum Andenken an den Begründer der Gesellschaft gestiftete Hofmann-Medaille zu übergeben. Professor Fischer concluded with the following remarks in English:—My dear Sir William, I am proud to have the honour of bringing you from Germany this sign of our esteem and admiration, and I hope that the medal will give you some pleasure, because it bears the venerable features of your late friend and teacher, August Wilhelm von Hofmann. (Cheers.)

The medal was accompanied by the following address:—

DIE DEUTSCHE CHEMISCHE
GESELLSCHAFT

hat Herrn

DR. W. H. PERKIN

in London

für ausgezeichnete Leistungen auf dem Gebiete der organischen Chemie, im
besonderen für die Begründung der
Teerfarben-Industrie,
den Hofmann-Preis
verliehen.

Berlin, im Juli, 1906.

Der Präsident:

E. FISCHER.

Die Schriftführer:

C. Schotten, W. Will.

SIR WILLIAM PERKIN, in reply, said:—I do indeed greatly appreciate the award of the Hofmann medal made by the German Chemical Society. It is very interesting to remember that Dr. Hofmann had a large share in the foundation of this Society. When in London he was constantly at our Chemical Society, giving most interesting and lucid accounts of his splendid work, and when he left England and went to Germany he realized the want of such a Society in his own country, and, in conjunction with others, the German Chemical Society was established in 1867, Dr. Hofmann being the first President. The first volume of the journal is very small, and contains only 282 pages, but its contents are exceedingly interesting in connexion with the Coal-Tar Colour industry, as it contains Graebe and Liebermann's most important paper on the synthesis of alizarin from anthracene, a colouring matter which is now manufactured in such enormous quantities and has superseded the use of the madder root, the original source of alizarin. Again, the very first paper in the volume is by Professor Baeyer, now Geheimrath Prof. Dr. von Baeyer, on the reduction of indigo blue, and, as we all know, the continuation of these researches eventually resulted in the artificial formation of this colouring matter also, and from the insight into its nature thus obtained indigo is now being made in very large quantities and taking the place of the naturally produced dye. The progress of the German Chemical Society, as we all know, has been very great, and its journal, instead of consisting of one small volume, now consists of three huge volumes, containing only original papers, and the largest part of the scientific work done in connexion with the Coal-Tar Colour industry has appeared in its pages. Its members also consist of men of science from all parts of the world, and now number considerably more than three thousand. I have been a Fellow of this Society from its early days, and I feel very proud of the honour the Society conferred upon me in 1884, 22 years ago, when it made me one of its honorary members; but I value this medal greatly because it is the "Hofmann medal," established in memory of the great

man under whom I studied chemistry and from whom I learnt so much, especially when, as his assistant, I helped him in his researches, and thus gained much knowledge and very valuable experience. Moreover, Dr. Hofmann, by his enthusiasm and force of character, stimulated my natural desire for research and helped to establish me in a course that I have pursued for more than 50 years. I also realize the kindness German chemists have always shown to me and my family. At the tercentenary celebration of the University of Würzburg, a good many years ago, I received the honorary degree of Doctor of Philosophy, and again only this week I received a similar degree from the ancient university of Heidelberg, given to me in connexion with the jubilee celebration, so that I feel that Germany has indeed honoured me. (Cheers.) I also greatly appreciate the action of the German Chemical Society in sending this medal by their President, one of Germany's greatest chemists, Geheimrath Prof. Emil Fischer (cheers), and I feel it a great honour to receive this medal from his hands. I also thank him very much for his eloquent and splendid address and all the kind and eulogistic things he has said in reference to myself. I feel it is almost superfluous for me to refer to the splendid work he himself has done in connexion with the Coal-Tar Colour industry, to his great work on the sugars, and, lastly, to his researches in the synthesis of the proteids, which command the universal admiration of chemists, and every one hopes that he may be able to continue this work so as to bring it to a thorough conclusion. I ask you, Prof. Fischer, to convey to the German Chemical Society my very best thanks for the honour they have done me, and I only wish that my old master had not only imparted his scientific spirit to me, but also his gift of language, that I might more adequately express my feelings on this occasion. (Cheers.)

PROFESSOR A. HALLER, who spoke in French, presented to Sir William Perkin the Lavoisier Medal and an address from La Société Chimique de Paris: He said:—

Monsieur,

Interprète de la Société chimique de Paris, de l'Industrie chimique et des hommes de science français, je suis heureux de pouvoir vous apporter leur témoignage d'estime et de reconnaissance pour l'œuvre féconde et durable dont vous avez illustré votre belle carrière.

Je ne saurais rien ajouter au brillant exposé que vient de faire de cette œuvre mon savant confrère Monsieur le Professeur Emil Fischer, mais éprouve un très grand plaisir à vous remettre, au nom de la Société chimique de Paris, la médaille Lavoisier ainsi que l'adresse suivante :—

LA
SOCIÉTÉ CHIMIQUE DE PARIS,

à l'occasion du Jubilé destinée à célébrer la cinquantième
anniversaire de la découverte

de la première matière colorante dérivée de la houille,
et comme témoignage de haute estime pour ses travaux,
est heureuse d'offrir

all

Dr. WILLIAM HENRI PERKIN,
Inventeur de la Mauvéine (1856),

sa

Médaille de Lavoisier

à l'effigie de celui qui fut l'un des premiers et des plus illustres applicateurs
des Sciences Chimiques

à l'industrie et à la prospérité publiques.

Le Secrétaire-Général :

Le Président de la Société Chimique de Paris :

A. BÉHAL.

ARMAND GAUTIER.

Juillet, 1906.

SIR WILLIAM PERKIN.—M. Prof. Haller,—The award of the Lavoisier Medal on this occasion is very gratifying to me. The memory of the great man with whom this medal is associated takes us a long way back in the history of chemistry, to a time when it was gradually developing into a science, and it is interesting to consider the rapid advances chemistry has made from the days of Lavoisier. To some extent my chemical education was influenced by French chemists. For while I was assistant to Dr. Hofmann, Prof. Cahours came and worked in collaboration with him, and I had the privilege of assisting in the work they were carrying on in reference to allyl compounds and the phosphorus bases. Afterwards Prof. St. Claire Deville came over for a short time, on account of a lecture on aluminium to be given in this theatre by the Secretary, the Rev. Mr. Barlow. Aluminium was at that time exciting great interest on account of the important and splendid researches of Deville, who first produced it in quantity, and brought most of its remarkable properties before the world. And I remember, amongst other things, he brought a kilo. of sodium with him, a most wonderful sight in those days. Most of the experiments for the lecture were rehearsed at the Royal College of Chemistry, and witnessed by myself and the other assistants. One experiment was the casting of a large ingot of sodium, and the question was as to what vessel it should be melted in, when Deville noticed an iron tea-kettle standing by, and said that would be the very thing. This amused us very much; the idea of pouring melted sodium from a tea-kettle was indeed a novelty, and, if my memory serves me right, Deville made the experiment. The Rev. Mr. Barlow, however, thought a tea-kettle too undignified a piece of apparatus to use at his lecture, and so he melted the sodium in an open iron ladle, with the result that the naphtha with which the sodium was covered caught fire, and it was not until Faraday, who was present, came to the rescue, and, by placing a porcelain dish containing water over the ladle, thus cooled the naphtha vapour, that the flame was extinguished. If the tea-kettle had been used this would not have happened. A little later on I was brought into correspondence with Pasteur owing to work on the artificial formation of tartaric acid in which I was engaged with my friend Mr. B. F. Duppa. Then I had the privilege of meeting Berthelot, when he came to this country to give a lecture at the Chemical Society on the synthesis of organic compounds. I also came into contact with Prof. Ad. Würtz, when he gave his lecture on glycol, and I well remember the experiments he made with that remarkable compound ethylene oxide. So altogether I saw a good deal of the French savants in my early days. There was another circumstance connected with France that has never been forgotten by me, and that is in reference to mauve. When this colour was first introduced the silk dyers took to it readily, but the cotton dyers and calico printers in this country did not seem at all keen about it, because, although it was a fast colour, they objected to it as it would not stand bleaching powder, and also thought it too dear. But the French realized at once the value of the dye for general purposes, and immediately applied it to calico printing, with the result that when the patterns came into the market all the other calico printers quickly followed suit. At the same time the French people were very generous to me personally. For as early as 1859—only three years after the discovery of mauve—they awarded me a silver and, later in the year, a gold medal. This first recognition of the importance of mauve was a great encouragement to me, and I have always greatly prized these two medals. And to-day I am proud to add to them the beautiful Lavoisier medal, and feel doubly honoured by receiving it from the hands of so illustrious a chemist as yourself, M. Prof. Haller, and I thank you very much for all the kind and eulogistic remarks you have made in your eloquent speech, and beg you will convey to the members of the Chemical Society of Paris my sense of the high distinction they have conferred upon me. (Cheers.)

DR. BAEKELAND (America) said :—Mr. Chairman, Sir William Perkin, Ladies and Gentlemen,—My American fellow chemists have done me the great honour to ask me to be their representative on this festive occasion. While I appreciate the distinction thus conferred upon me, I cannot help regretting that my friends did not select a more brilliant speaker, one who would have been able to do better justice to Sir William Perkin's achievements as well as to the American chemists themselves. In the circumstances I shall refrain from describing the great importance of the discoveries of Sir William Perkin, and the tremendous impulse they have given to chemical research. Better oratorical talent than mine has, and will, develop this inspiring subject to-day. But it gives me great pleasure to emphasize the fact that as soon as we knew in America that this celebration was to take place the idea was welcomed with the warmest enthusiasm. A committee was formed, including the most prominent names in science and industry, for the purpose of making this jubilee worthy of its object. Amongst other resolutions adopted, it was agreed that part of the funds raised should be applied for creating a chemical library in the United States which will be called the "Perkin Library" (cheers), and which will thus commemorate the name of the man whom we honour to-day. I should have liked to have been able to announce at this moment that every detail of our programme has been carried out and finished, but according to the news I have received from the other side it appears that, with all the industry my friends are displaying, it will take a little more time before their work is completed. Sir William Perkin, on behalf of

THE CHEMISTS IN THE UNITED STATES OF AMERICA.

I have come to congratulate you on the eminent services you have rendered to chemical science, and to chemical industry, for the greater benefit of mankind. (Cheers.) On this day, when the whole scientific world remembers your brilliant and useful career, we express the sincere hope that your noble life may continue for many years more as an example to every chemist, and as an inspiration for future research work to the younger generation. And let me add that these plain words of mine are but a very incomplete expression of the warm sentiment and admiration of your good friends in America. (Cheers.)

SIR WILLIAM PERKIN :—I feel very much gratified in hearing your remarks, and at receiving this address from my American friends, who, although living on the other side of the Globe, are so nearly related. Their participation in this celebration adds greatly to its international character, and for this I thank them very much. Very lately the American Chemical Society has done me the honour of electing me, in connexion with this jubilee, an honorary Fellow (cheers), an honour which I very much appreciate.

The CHAIRMAN here announced that a congratulatory telegram had been received from the Chemical Institute at Padua.

(From PROF. NASINI, University of Padua.)

"Dr. Perkin fondatore glorioso industria colori catrame chimico fisico illustre, cui devesi capitale potere rotatorio magnetico, gentiluomo ottimo ospitali; dolente non intervenire. Invio congratulazione auguri.—Nasini."

PROFESSOR DR. PAUL FRIEDLÄNDER, in presenting an address on behalf of the SCIENTIFIC AND TECHNICAL CHEMISTS IN AUSTRIA,

speaking in English, said :—I have the great honour to be the bearer of the congratulations of all Austrian chemists, who are proud to have this opportunity of sending their heartiest greetings to Sir William Perkin, with vast numbers of others from all parts of the world, on this great and memorable occasion. I ask you, Sir

William, kindly to accept this address, which contains a list of names of all the Austrian scientific and industrial chemists, and which is intended to serve as a recognition of the high esteem and admiration in which you are held by them. (Cheers.) Professor Friedländer then read the text of the address, as follows :—

Die unterzeichneten Vertreter der theoretischen und praktischen Chemie haben mit Freuden den Anlass des fünfzigjährigen Bestehens der Teerfarbenindustrie ergriffen, um Ihnen, hochverehrter Herr College, ihre herzlichsten Glückwünsche darzubringen.

Vor einem halben Jahrhundert begannen Sie Ihre glänzende chemische Laufbahn mit der Darstellung des ersten Anilinfarbstoffes, des Mauvéins. Ihr Scharfblick erkannte sofort die industrielle Wichtigkeit dieser Entdeckung, Ihrer Energie gelang die Ueberwindung der mannigfachen Schwierigkeiten die sich der fabrikmässigen Erzeugung in den Weg stellten. Sie schufen damit den ersten Keim einer Industrie, deren Früchte der ganzen civilisierten Welt zu gute kommen und die wie kaum eine andere auf die verschiedenartigsten chemischen wie mechanischen Industrien umgestaltend und anregend eingewirkt hat. Die mächtige Entwicklung der Teerfarbenindustrie, die Sie während der folgenden Decennien stets fördernd auf allen Etappen begleitet haben, wird stets unlösbar mit Ihrem Namen verbunden bleiben. Schon in den Anfängen der Industrie erkannten Sie die charakteristische Bedingung an welche ihre erfolgreiche Weiterentwicklung notwendig gebunden ist, in dem innigen Zusammenhang zwischen Industrie und Wissenschaft und Sie haben sich beide in gleichem Maasse zu Dank verpflichtet durch die Darstellung und Untersuchung einer grossen Zahl neuer Verbindungen, durch die wissenschaftliche Aufklärung zahlreicher Vorgänge, die für die Farbenindustrie von grösstem Interesse waren. Ihren Arbeiten über das Cumarin verdanken wir eine neue Synthese ungesättigter Säuren deren allgemeine Anwendbarkeit in höchstem Maasse fördernd und entwickelnd auf die Erkenntniss grosser, wichtiger Gebiete der organischen Chemie eingewirkt hat, und die schon längst mit Recht Ihren Namen trägt. Durch Ihre zahlreichen und wertvollen Untersuchungen über magnetische Polarisations Erscheinungen an organischen Verbindungen haben Sie auf Momente hingewiesen, die für die weitere Entwicklung der theoretischen Chemie von immer grösserer Wichtigkeit zu werden versprechen. Möge Ihnen, hochverehrter Herr College, noch eine lange Zeit geistiger und körperlicher Frische und Schaffenslust beschieden sein zum Segen der chemischen Wissenschaft und Industrie, zur Freude Ihrer Verehrer.

A. Lieben.

F. Emich.

E. Donath.

L. Marchlewski.

H. Miller v. Aichholz.

E. v. Portheim.

K. Brunner.

P. Friedländer.

G. Goldschmidt.

W. Suida.

S. Skraup.

and 161 other Austrian chemists.

SIR WILLIAM PERKIN :—I feel very much honoured by your kind remarks, and also by the address which you have presented to me from the scientific and technical chemists of Austria. I am very pleased to receive this from one who has such a great practical knowledge of the Coal-Tar Colour industry. (Cheers.)

PROFESSOR DR. P. VAN ROMBURGH presented on behalf of

THE CHEMISTS OF HOLLAND

the following congratulatory address in English :—

Dear Dr. Perkin,—Fifty years have elapsed since your splendid discovery of the aniline purple, made in your rough laboratory at home. Seldom has a

discovery effected such a far-reaching influence as this. Not only has it been the starting-point of an industry which holds a unique position in the history of chemical industries, but it has proved to be of the greatest importance for chemical science, too. We, the undersigned Dutch chemists, wish on the occasion of your jubilee to offer you our hearty congratulations. When we call to mind the great difficulties you had to surmount in your pioneering work, at a time when organic chemistry was still in its infancy and commercial chemicals were rare, it is impossible not to admire your almost unexampled success. Not satisfied to have created the Coal-Tar Colour industry, you have taken moreover a great part in the foundation and promotion of the artificial alizarin manufacture in your country. You have not only put your abilities at the service of technical chemistry, but also contributed in a large measure to the development of organic chemistry by the classic synthesis of unsaturated aromatic acids, and by a number of important investigations, and to that of physical chemistry by your thorough researches on magnetic rotation. The value of the services rendered by you to your country and to science are beyond our praise, and we in Holland look with admiration and gratitude on the half-century of your most useful work. May you long be spared to witness the blessed results of your long devotion to the cause of science and industry.

XXVI. July, MCMVI.

AMSTERDAM.

H. W. Bakhuis Roozeboom.

W. A. van Dorp.

A. F. Holleman.

DELFT.

L. Augustisny.

S. Hoogewerff.

GRONINGEN.

J. F. Eykman.

LEIDEN.

F. A. H. Schreinemakers.

A. P. N. Franchimont.

UTRECHT.

Ernest Cohen.

P. van Romburgh.

SIR WILLIAM PERKIN :—It is very kind of you to bring this address from Holland from your eminent countrymen, and I am very gratified at the expressions contained in it in reference to my work. I hope you will convey to them my best thanks. (Cheers.)

PROFESSOR DR. H. RUPE, on behalf of the Vorstand der

SCHWEIZERISCHEN CHEMISCHEN GESELLSCHAFT,

presented a congratulatory address, in the following words :—

Hochgeehrter Herr Perkin,

Es ist mir die hohe Ehre zu Teil geworden, Sie heute im Namen der Schweizerischen Chemischen Gesellschaft zu begrüßen und Ihnen die herzlichsten Glückwünsche der Schweizerischen Chemiker zu überbringen.

Die Nachricht, dass die fünfzigste Wiederkehr der Entdeckung des ersten Teerfarbstoffes in England festlich solle begangen werden, hat auch in unserem Lande einen lebhaften und freudigen Wiederhall gefunden. Und mit Recht! Ist doch der Ursprung unserer blühenden chemischen Industrie direct auf Ihre Entdeckung zurückzuführen. Denn wenn die Perkin'sche Fabrik zu Greenford Green die erste aller Fabriken künstlicher organischer Farbstoffe überhaupt war, so entstand die erste Teerfarbenfabrik des Continentes in Basel, in der Schweiz, im Jahre 1858.

Und somit ist dieser Tag auch für unsere alte Stadt am grünen Rhein ein höchst bedeutungsvoller.

Und nun habe ich die Ehre, die Adresse zu verlesen, welche Ihnen die Schweizerische Chemische Gesellschaft überreicht :—

Hochgeehrter Herr !

An dem heutigen Tage, an welchem Ihnen aus allen Weltteilen die herzlichsten Glückwünsche entgegengebracht werden, sendet Ihnen auch die Schweizerische Chemische Gesellschaft die Versicherung grosser Verehrung und Dankbarkeit.

Vor 50 Jahren machten Sie jene Entdeckung, welche für die chemische Industrie sowohl als für die wissenschaftliche organische Chemie von der allergrössten Bedeutung war. Sie fanden den ersten Teerfarbstoff das Mauvëin. Heute freuen wir uns an dem gewaltigen Siegeslaufe, den Ihre Erfindung gegangen ist.

Im Alter von nur 18 Jahren unternahmen Sie es, kühn und tatkräftig, die industrielle Ausarbeitung Ihrer Erfindung selbst in die Hand zu nehmen und die erste Anilinfarbenfabrik zu gründen.

Auch unser Vaterland, die Schweiz, zog grossen Nutzen aus Ihrer Entdeckung. Bald darauf entwickelte sich in Basel eine blühende Farbenindustrie, und heute nimmt unser kleines Land unter den Staaten, welche Teerfarbstoffe producieren, eine hervorragende Stellung ein. Darum gedenkt Ihrer heute voll besonderer Dankbarkeit die Farbstoffe-Industrie der Schweiz !

Wir bewundern zugleich an Ihrem Schaffen, dass sie neben Ihren vielseitigen Tätigkeit als grosser Industrieller, mitten in der Ueberwindung der vielen Schwierigkeiten, die mit der Begründung einer neuen Industrie verbunden sind, noch die Zeit fanden, die Wissenschaft mit bedeutenden Untersuchungen zu bereichern. Ihre schönen Synthesen auf dem Gebiete der organischen Chemie, sowie Ihre wichtigen Arbeiten in physikalischer Richtung sichern Ihrem Namen einen ehrenvollen Platz unter den Forschern aller Zeiten.

Mögen Ihnen noch viele glückliche Jahre ergiebigen Wirkens beschieden sein !

26 Juli, 1906.

Der Vorstand der Schweizerischen Chemischen Gesellschaft.

Die Schriftführer :

AMÉ PICTET (Präsident).

H. Rupe.

St. v. Kostanecki.

SIR WILLIAM PERKIN :—Thank you very much for this address and for the remarks you have made. It is interesting to receive an address from Switzerland, where the industry has been so much followed, even from its very early days.

PROFESSOR DR. CARL DUISBERG, speaking in English, said :—Dear Sir William, my Lords, Ladies and Gentlemen, besides the "Deutsche Chemische Gesellschaft," which devotes its attention exclusively to scientific purposes, and the "Verein zur Wahrung der Interessen der chemischen Industrie Deutschlands," whose work is devoted to the economical development of the German chemical industry, the German chemists are united in another great society called the "Verein Deutscher Chemiker." This society comprises not merely those chemists engaged in scientific work but also those employed in the industry. It not only cultivates applied chemistry, but also has the object of furthering the social welfare of its members. This great union of German chemists, the

"VEREIN DEUTSCHER CHEMIKER,"

takes an especial interest in this unique jubilee, which you, my dear Sir William, are celebrating this day, and the Verein has therefore appointed two members of its committee, Geheimrat Delbrück, of Berlin, and myself, to convey to you their heartfelt congratulations and best wishes.

As the manager of one of the largest German colour works, the Farbenfabriken, vorm. Friedr. Bayer and Co., I am personally most particularly pleased to submit these wishes, seeing that I and my German colleagues are now the gardeners in the large and extensive garden laid out by William Henry Perkin 50 years ago, and that it has fallen to our lot to assist in cultivating and grafting the young

plant planted by him when half a century ago he invented the first aniline dye "mauve," and to gather the fruits from the large orchard, full of strong and mighty trees which have grown up to full maturity within the past five decenniums from this small and delicate plant. We admire in the man, whose jubilee we are celebrating, not only the scientific chemist and inventor, but still more the technical chemist and founder of the Coal-Tar Colour industry, who, not only discovered and prepared in his laboratory the first aniline dyestuff, but also started the manufacture of the same in bulk at a time when organic technical chemistry was merely in its swaddling clothes, when the intermediate product aniline, necessary for the technical preparation of mauve, now prepared in millions of pounds, was a rare product in the laboratory, and when even the chemically pure benzol, which nowadays is produced in millions of kilos, was only to be had in small quantities, and in an impure state. All those of us who carry out technical work, and who have thoroughly gone through such, know what great patience is necessary, and what great trouble and difficulties have to be surmounted before a chemical product, discovered in the laboratory, can actually be manufactured. We admire the man who could do this 50 years ago, when there was neither technique in chemical apparatus, nor when suitably constructed manufacturing implements had been invented. As the heirs to the inventive and technical experience made by William Henry Perkin in the year 1856, we German colour manufacturing chemists regard it as our sacred duty to be personally present in the English metropolis in order most cordially to shake the hand of our esteemed and honoured forerunner in this particular scientific and technical branch, and to express to him our heartiest thanks for his great fundamental achievement. Herein all the members of the Verein deutscher Chemiker sincerely join. In the general meeting of the Verein held in Nürnberg on June 7 last we already celebrated this commemoration. Our esteemed and worthy honorary member, Adolf von Baeyer, the "Altmeister" of German scientific chemistry, who together with Perkin, the discoverer of the first aniline colour and founder of the Coal-Tar Colour industry, on the one hand, and Hofmann, Perkin's teacher, the man so great in the research and study of aniline and the artificial dyestuffs derived therefrom, on the other hand, has more than any one else worked in the building up and elucidation and completion of the scientific chemistry of Coal-Tar products and dyestuffs by synthesis, read before the meeting a paper especially prepared for the momentous occasion under the title "On Aniline Dyestuffs" (see *Zeitschrift für angewandte Chemie*, 1906, **19**, 1287). At the express desire of our great master we have the pleasure of handing this lecture to you as the most valuable testimonial of our esteem. It is, as the author in the introductory part especially and verbally declares, merely a modest one; it confines itself to the completion of the experimental material for the discussion of the connexion between colour and chemical constitution. Baeyer says further:— I, therefore, hope that just on account of its speciality it will give him particular pleasure. It is especially noteworthy that the founder of the aniline colour industry did not restrict himself and his work to the finding of new aniline dyes, but he also took on himself the burdensome task of studying the magnetic rotation of the polarization plane in order to get a full insight into the construction of the chemical molecule. His countryman Hartley followed in his steps, and in a similar way measured the absorption of the ultra-violet rays in a countless number of chemical compounds. If I now place before you a series of experiments with the aniline colour material, an explanation for which is only found in Hartley's work, you will, as it were, observe a representation of the scientific development of William Henry Perkin. Adolf von Baeyer concludes his lecture with these words:—"The key to the knowledge of the nature of aniline colours lies

in the basic properties of the carbon atom. The aniline colours, which delight the eye, have thus attained much more importance to science. Their rays are the torch which enlightens the path of the explorer in the dark regions of the interior of the molecule, and the man who has lit the torch is William Henry Perkin." So far Adolf von Baeyer. I have therefore the honour and pleasure of handing you, my dear Sir William, in the name of and at the request of the Verein deutscher Chemiker, an especially printed copy of this lecture bound in "mauve" dyed leather as a token of our gratitude and esteem. Geheimrat Delbrück and myself do not attend this meeting alone, but about three and a half thousand German chemists, the members of our Verein, are present to-day in spirit, celebrating with us this singular festival. It is their sincere wish and hope that you, dear Sir William, may long enjoy the well merited repose after your laborious career, and retain the same mental and physical vigour which you now display in our presence, thus gladdening all the members of your family and your large circle of friends, and may God's blessing rest upon you to our benefit.

SIR WILLIAM PERKIN.—I thank you very much for the remarks which you have made in reference to me, and for the eulogistic terms in which you have referred to my work. I also thank you for this copy of Prof. von Baeyer's lecture, which I shall read with great interest.

PROFESSOR A. HALLER next presented to Sir William Perkin a medal, and an address from

LA SOCIÉTÉ INDUSTRIELLE DE MULHOUSE.

He said :—

Monsieur,

À la marque de haute estime qu'ils vous ont donnée il y a déjà de longues années, mes compatriotes de la Société Industrielle de Mulhouse ont tenu à en ajouter une autre, en vous décernant leur grande médaille d'honneur et le titre de Correspondant. Il m'est particulièrement agréable d'avoir été choisi par mes collègues de la grande cité industrielle pour vous offrir, de la part de la Société, cette médaille et l'adresse qui l'accompagne.

The address is as follows :—

Monsieur W. H. Perkin, Londres.

Monsieur,—

Il y a cinquante ans que vous avez inauguré par la découverte de la mauvéine, l'industrie des matières colorantes artificielles dérivées du goudron de houille et qui, révolutionnant de fond en comble l'art de la teinture et de l'impression, a pris un développement inimaginable.

La Société Industrielle de Mulhouse, et tout particulièrement son comité de chimie, ne peuvent laisser passer cet anniversaire sans vous apporter le juste tribut de leur haute estime et de leur sympathique admiration. Puissiez-vous consacrer pendant longtemps encore aux progrès de la science, vos forces et votre talent.

Vous avez eu la rare bonheur d'inaugurer par une belle découverte le point de départ à la fois de l'évolution moderne dans tout un groupe de l'activité humaine et de cette immense industrie des matières colorantes que personnes, il y a cinquante ans, n'eut osé prévoir.

C'était l'action de l'éclat d'un jeune homme de 18 ans sur le terrain industriel, action pleine de promesses qui ont été tenues.

Mais vous ne vous êtes pas borné à poursuivre l'avancement de la pratique. La chimie vous doit des découvertes importantes ; seules elles eussent suffi à rendre votre nom illustre parmi les adeptes de la science pure.

Dès 1884 la Société Industrielle de Mulhouse vous a décerné sa médaille d'or, la plus haute distinction dont elle disposait et elle se plaît à la rappeler.

Aujourd'hui, pour renouer plus étroitement les liens qui vous attachent à elle, la Société Industrielle de Mulhouse vous offre, pour célébrer le cinquantième anniversaire de votre découverte une médaille d'honneur et vous prie de prendre place dans les rangs de ses membres correspondants, et elle espère que vous lui appartenez à ce titre pendant de longues années.

Agréez, Monsieur, l'assurance de ma considération la plus distinguée.

Le Président de la Société Industrielle,

AUG. DOLLFUS.

SIR WILLIAM PERKIN.—I thank you very much for bringing over this medal and address. It is not the first time I have had a medal from Mulhouse. I am very glad to receive this one, and I thank your society very much for the honour it has done me.

HOFRATH DR. H. CARO, speaking in English, said :—Dear Sir William Perkin,—I have the great joy and honour to be on this festive day the bearer of a congratulatory message to you from your German friends and admirers—from the

SOCIETY OF GERMAN CHEMICAL MANUFACTURERS,

in whose laboratories and workshops Coal-Tar is transformed nowadays into thousands of commercial products of widespread utility. They all know your honoured name and remember thankfully that, 50 years ago, British inventive genius and enterprise created a new era of scientific and industrial progress. This glorious era of a formerly unknown union of science and industry was inaugurated by your discovery of the first aniline colour, of which all chemists celebrate to-day the golden jubilee, and rightly so. (Cheers.) Truly this first aniline colour was the pioneer, and made clear the path for all that followed. Allow me now to read to you my message, which is signed by the President of the Society. (The address was then read as follows :)

Zum 50 jährigen Jubiläum der Teerfarbstoffindustrie entbietet ihrem unsterblichen Gründer William Henry Perkin der Verein zur Wahrung der Interessen der chemischen Industrie Deutschlands in Dankbarkeit und Bewunderung Gruss und Glückwunsch.

Der Vorstand,

J. F. HOLTZ.

SIR WILLIAM PERKIN.—Dear Dr. Caro, no one knows better than you about the work of the early days of the Coal-Tar Colour industry, and I appreciate very much your being present here to-day—you who have done so much for the enrichment of the industry itself and for its development. I have received your address with very great pleasure, and I beg of you to give my thanks to the Society of German Chemical Manufacturers. At the same time, allow me to say how very thankful I am to see you here once more in this country.

PROFESSOR DR. G. SCHULTZ (Munich Chemical Society), speaking in German, said :—

Hochverehrter Herr Perkin!

Hochverehrte Anwesende!

Die

MÜNCHENER CHEMISCHE GESELLSCHAFT

hat mich, ihren derzeitigen Vorsitzenden, beauftragt Ihnen, sehr verehrter Herr Perkin, am heutigen Tage eine Adresse zu überreichen, um Ihnen unsere Hochachtung und Verehrung für Ihre technischen und wissenschaftlichen Leistungen auszudrücken.

Diese Adresse lautet, wie folgt :

MÜNCHENER CHEMISCHE GESELLSCHAFT.

WILLIAM HENRY PERKIN,

Ph.D., LL.D., D.Sc., F.R.S., F.C.S.,

The Chestnuts,

Sudbury, Harrow,

Near London.

Hochverehrter Herr !

Die Münchener Chemische Gesellschaft benützt die Gelegenheit des 50 jährigen internationalen Teerfarben-Jubiläums, um Ihnen, sehr verehrter Herr, als dem Erfinder und Fabrikanten des ersten technisch verwendeten Teerfarbstoffs ihre herzlichsten Grüsse und Glückwünsche zu übersenden und ihre Hochachtung und Anerkennung für Ihre Verdienste um Wissenschaft und Industrie auszusprechen.

Der erste Vorsitzende,

PROFESSOR DR. GUSTAV SCHULTZ.

München, den 10. Juli, 1906.

SIR WILLIAM PERKIN.—It has given me very great pleasure to receive this address, and I am very glad to have the pleasure of meeting one who, like yourself, has had so much to do with the Coal-Tar colours, especially in the compilation of the useful and interesting table of Coal-Tar colouring matters.

THE CHAIRMAN.—An address will now be presented from the

ROYAL SOCIETY,

which I will read. I will ask Lord Kelvin to present it on behalf of the President of the Royal Society. (The following address was then read by the Chairman :)

The Royal Society, Burlington House, London, W.,

July 20, 1906.

Dear Dr. Perkin,—Although the Royal Society is not now in session, it would, I am sure, regret if the advantage were not taken of the opportunity of offering you congratulations on its behalf, in view of the approaching Jubilee Celebrations in which you will be a central figure. It is true that the Coal Tar industry is a matter mainly of applied science and technology, which might be considered in itself not to touch very closely the sphere of action of the Royal Society ; but we cannot forget that this wonderful industrial and social development could have been initiated and carried on only through the methods that have been established for the pursuit of knowledge as a reward in itself and primarily for its own sake. The Royal Society recognizes in your life-work, from the early successes that pointed the way to such immense material results, down to your recent work in probing the latent affinities of asymmetric organic substances by the agency of their magneto-optic relations—the latter far removed as may now be thought from any prospect of industrial application—a striking instance of the reward and satisfaction that comes not seldom to a career devoted to the single-minded pursuit of knowledge. Nor can the Royal Society fail to reflect how such activity is contagious, when it recalls that other names in your family besides your own are already inscribed in its roll of honour.

With very cordial wishes for your future welfare and happiness,

I am, dear Dr. Perkin, yours most sincerely,

RAYLEIGH, President, R.S.

LORD KELVIN.—On behalf of Lord Rayleigh, the President, I have the great honour, and personal pleasure, of presenting this address to you, Sir William. (Cheers.)

SIR WILLIAM PERKIN.—I thank you very much, Lord Kelvin, and also the Royal Society for sending me an address. It is a society with which I have had to do since I was 28 years old, and it has also honoured me on other occasions by awarding me two of its medals. I appreciate this address extremely, and thank you very much for it.

THE CHAIRMAN.—I have now the honour of presenting on behalf of the
CHEMICAL SOCIETY OF LONDON
 the following address :—

Burlington House, London, W.

Address to

SIR WILLIAM HENRY PERKIN, Ph.D., LL.D., F.R.S.,
 from the
 Chemical Society.

Among those who congratulate you on the occasion of the celebration of the 50th anniversary of your discovery of the first Coal-Tar Colour, the Chemical Society is not only aware of your great services to chemical science and chemical technology, but may claim to know you more intimately than can any other body. Elected a Fellow in the year in which you began to manufacture Mauve, you are one of its oldest members ; as one of its secretaries during the years 1869-83, and as its president in 1883-85, you have rendered most valuable service in the conduct of its affairs ; but it is chiefly for your many contributions to its proceedings that it is indebted to you. Singularly consistent in your choice of the Society's publications as the means of making your work known, you have at all times been one of the chief supporters of its efforts to promote the progress of chemical science.

It is impossible to overrate the value directly and indirectly of your discovery ; the evidence of the influence which it has exercised is overwhelming. And it is noteworthy that you should have been active not only at the beginning of the colour industry, but that you have more than once intervened to assist its progress, notably by the part which you took in the development of the manufacture of the madder colours by your work on cinnamic acid, which was of critical importance in the early stages of the development of the artificial indigo industry, and by your discovery of a method of producing coumarin artificially, which entitles you to rank as the pioneer in the establishment of an important offshoot of the colour industry, that of artificial perfumes. The extraordinary progress of chemical science during the past half century indeed is in a very large measure the outcome of your discovery ; had it not been proved to be a useful science, chemistry would never have attracted the army of workers whose victories have led to the marvellous developments which are to be chronicled on every side. The advance of knowledge is little short of miraculous, especially in view of the difficulties with which chemists are confronted.

But however highly your technical achievements be rated, those who have been intimately associated with you must feel that the example which you have set by your rectitude as well as by your modesty and sincerity of purpose is of chiefest value. That you should have been able, as a very young man, to overcome the extraordinary difficulties incident to the establishment of an entirely novel industry 50 years ago is a clear proof that you were possessed in an unusual degree of courage, independence of character, judgment, and resourcefulness ; but even more striking is your return into the fold of scientific workers and the ardour with which you have devoted yourself to the prosecution of abstract physico-chemical inquiries of exceptional difficulty. In the account of your renowned master, Hofmann, you have stated that one of your great fears on entering into technical work was that it might prevent your continuing



W. H. PERKIN

at the age of 14.

From a photo taken by himself (1852)

research work ; that you should have felt such regret at such a period is sufficiently remarkable, and it must be a source of enduring satisfaction to you to know that your later scientific work deserves, in the opinion of many, to rank certainly no less highly than your earlier.

It is with a feeling of just pride that the Chemical Society now places on record its deep sense of the obligation which you have laid upon it by having won for British chemical science the incomparable distinction of making so great a step in the progress of civilization as is marked by your discovery and its consequence.

Signed on behalf of the Chemical Society, this Twenty-sixth day of July, 1906.

RAPHAEL MELDOLA, President.

ALEXANDER SCOTT, Treasurer.

M. O. FORSTER, } Honorary

ARTHUR W. CROSSLEY, } Secretaries.

WILLIAM RAMSAY, Foreign Secretary.

SIR WILLIAM PERKIN, in reply, said :—Professor Meldola, I thank the Chemical Society very much for presenting me with this address. The very friendly association that I have had with the Fellows and Officers of the Chemical Society has always been to me a source of great pleasure, and the stimulus I have received by attending the meetings and hearing the communications read and discussed has also been a great help to me. The proposal of placing my bust, executed by the eminent sculptor F. W. Pomeroy, A.R.A., in the rooms of the Chemical Society is an honour that touches me deeply, because I have always taken a keen interest in that Society and have been long associated with it, this year being the Jubilee of my Fellowship (as you have mentioned). For seventeen years, also, I was Secretary, and for two years President. (Cheers.) How wonderfully has the Society grown in that period, and how greatly has its usefulness extended ! In 1856 the number of Fellows was 261 ; its present number is over 2,700. It is to this Society that I have contributed nearly all my own researches. For these reasons I look upon the Society as a kind of scientific home. You will, therefore, understand how touched and gratified I am at the thought of having my bust placed in the Society's rooms in association with the busts of great men which are already there. (Cheers.)

Dr. EDWARD DIVERS then presented a congratulatory address from the

SOCIETY OF CHEMICAL INDUSTRY.

He said :—My dear Sir William, the President of the Society of Chemical Industry, Mr. E. Carey, of Liverpool, is unfortunately unable to be present, and he has asked me, as his immediate predecessor in office, to present an address from our Society. He wishes me to convey to you the expression of his profound regret at having to be absent. The honour of presenting this address might well have devolved upon some one more worthy than myself, and yet there is an element of fitness in the duty having fallen upon me. Although I need not indeed remind you, I would respectfully have this august assemblage of chemists hear from me that you and I, of the same age, were boys together at the City of London School (cheers), and we were pupils of Mr. Thomas Hall, where we had our first education in Chemistry. We were afterwards examined by the late Sir Frederick Abel in chemistry, and later on we were sent to the Royal College of Chemistry to study under Hofmann, Mr. Hall, himself a pupil of von Hofmann, having persuaded, in each case, our parents to let us follow our bent and devote ourselves to chemistry. (Cheers.) One difference between us at this time was that, while you were behind the lecture table assisting Mr. Hall in his experiments, I, a year later than yourself in the school rank, was one

of the juvenile audience. Another difference was that I went on more quickly to the College of Chemistry, and therefore had the opportunity of hearing the last course of lectures which von Hofmann gave in the theatre of the Royal College of Chemistry in Oxford-street, whereas you, a session later, attended his lectures when they were given in the Royal School of Mines in Jermyn-street. In consequence of our leaving the School at different times, and attending the College of Chemistry in different years, I lost sight of you, and to my recollection never met you again until a few years ago, on my return from Japan. We had both been Presidents of the Chemical Section of the British Association and of the Society for which I now appear. Though these facts may have very little interest to you, they have obviously a very great significance for me when I stand before you to present this address, 55 years after the time when we took together our first step in our beloved science. (Cheers.) Sir William Perkin, the Society of Chemical Industry offers to you its earnest congratulations on the occasion of the fiftieth anniversary of that great event both in chemical science and industrial arts—your epoch-making discovery of the first Coal-Tar dyestuff. (Cheers.) (The following address was then read :)

SIR WILLIAM HENRY PERKIN, Kt., LL.D., D.Sc., Ph.D., F.R.S.

The Society of Chemical Industry offers to you its warmest congratulations on the occasion of the fiftieth anniversary of that great event, momentous both in chemical science and in the industrial arts—your epoch-making discovery of the first Coal-Tar dyestuff.

As a consequence of that discovery, you were left free, at an unusually early age, to follow any course your inclination might suggest, and in that freedom you have, to your honour be it said, unswervingly devoted your whole life to the prosecution of chemical research. In that career your achievements have been so splendid that, even had it been possible to forget your discovery of the first Coal-Tar colour, these achievements alone would have gained for you that eminent position which you hold among chemists.

Happy in the results of your own researches, you have the additional happiness of your sons following you with distinguished success in the work of extending the boundaries of the science of chemistry.

The Society remembers with pleasure that at its foundation you were chosen one of its Vice-Presidents, and that three years afterwards you became its President. It cherishes the recollection of the services you then rendered it, and recalls with satisfaction that the Society early awarded its medal to you as a further mark of its profound appreciation of your work in chemical technology.

There only remains to the Society to-day, at this international celebration of the Jubilee of the foundation of the Coal-Tar colours industry, to do homage to your great attainments and high character, and to wish you many happy years of health and activity.

EUSTACE CAREY, President.

July, 1906.

SIR WILLIAM PERKIN.—Professor Divers, my old schoolfellow, I thank you very much for all the kind things you have said, and I thank the Society of Chemical Industry very much also for giving me this address. (Cheers.)

The CHAIRMAN here stated that a congratulatory telegram (see page 8) had just arrived from the Chemical Society of Copenhagen. (Cheers.)

PROFESSOR PERCY FRANKLAND.—Sir William Perkin, I have the honour, on behalf of the

INSTITUTE OF CHEMISTRY,

to present you with the following address, and we are proud to think that you are one of the original Fellows of our Institute. (Cheers.)



W. H. Perkin.
at the age of 22 (1860).

SIR WILLIAM HENRY PERKIN, Knt., Ph.D., LL.D., D.Sc., F.R.S.

The President, the Council, and the Fellows and Associates of the Institute of Chemistry of Great Britain and Ireland, as representing the profession of Chemistry, desire to tender their sincere congratulations on the occasion of the fiftieth anniversary of your memorable discovery of

MAUVE.

The extraordinarily far-reaching consequences of this discovery are so well known, even outside the ranks of science, that it is unnecessary to enumerate the varied benefits to mankind which are directly traceable to this product of your genius.

The international character of the Jubilee now being celebrated bears eloquent testimony to the universal recognition which your services have received from those most competent to assess their value.

Besides associating ourselves with those who are to-day commemorating the romantic story of the research so fertile in its results, on which you were engaged at the early age of 18 years, we would also express our admiration of your whole career, animated as it has been by the ardent enthusiasm which has led you to devote your great abilities to the service of science with rare singleness of purpose.

We rejoice to think that you, who a half-century ago achieved such signal fame, should still be amongst us in the enjoyment of health and vigour, an active contributor to scientific progress, and it is our earnest wish that you may long be spared to the large circle of admiring friends and colleagues who are to be found in every part of the world.

In accordance with a resolution of the Council, signed on behalf of the Institute of Chemistry,

PERCY F. FRANKLAND, President.

ALFRED GORDON SALAMON, Treasurer.

RICHARD B. PILCHER, Registrar.

26th July, 1906.

SIR WILLIAM PERKIN.—I thank the Institute of Chemistry for so kindly presenting me with this address, and I am very pleased to receive it from their President, the son of my old friend Sir Edward Frankland, who, when professor at this institution, did such important work and so often lectured in this room. (Cheers.)

SIR THOMAS WARDLE, in asking Sir William Perkin's acceptance of an address from the

SOCIETY OF DYERS AND COLOURISTS,

said:—Mr. Chairman, my Lords, Ladies, and Gentlemen,—I think we are now coming from the scientific to the practical. As a practical dyer, and having the honour of being President of the Society of Dyers and Colourists, and representing them on this occasion, it is my pleasure to offer Sir William Perkin our most hearty congratulations. (Cheers.) The Society of Dyers and Colourists, which originated in Bradford, and now has also a branch in London, is a very important practical and scientific society, and desires to join with other societies in doing homage to the worth and ability of Sir William Perkin. (Cheers.) The address which I have the honour to offer to Sir William Perkin will be read in a few minutes by my colleague on the Council, Mr. Hickson. I am old enough to remember the discovery of mauve, for I was one of the earliest of those who brought it into commercial utilization. It succeeded a natural dyestuff of similar shade produced by an old friend of mine in Lyons, which it successfully replaced. Not only has it been used for the purposes I have mentioned, but I remember some time ago hearing Professor Hofmann relate an amusing story of how, when he took some students, while Professor at Berlin, to America, they wandered far away into the North-West regions, and, coming across a band of North-American Indians, they found, to their surprise, all of them were dyed from head to foot with Perkin's mauve. (Laughter.) I will now ask Mr. Hickson to be good enough to read the address.

Mr. HICKSON then read as follows :—

To WM. HENRY PERKIN, Ph.D., LL.D., D.Sc., F.R.S., &c.

Dear and Honoured Sir,

The occasion of the fiftieth anniversary of your discovery of the first Coal-Tar Dye is deemed by the Society of Dyers and Colourists to be a fitting one on which to assure you of their appreciation and esteem.

This Society has arisen out of the Industry which your life's work has so largely created ; it represents the scientific side of the Tinctorial Industry of Great Britain to-day ; so feels specially qualified to address you on behalf of those of your fellow-countrymen most directly interested in the results of your achievement.

Rarely in the annals of Science or Industry does it fall to the lot of the investigator to see the results of half a century of the development of his Discovery. " Art is long," and the fleeting years hurry most of us hence when we have seen but little of the fruition of our toil. But the " Providence which shapes our ends " has given to you the benediction of fruitful years. Your colleagues in Science and Industry and your many admirers in all lands rejoice that you have lived not only to sow the seed, but to see the rich and abundant harvest with which the changeful years have crowned your youthful sowing.

You have given to applied science a new world to conquer and to cultivate. You have shown to us all that knowledge is not only the source of wealth, but the dispenser of rich and innumerable blessings. Undreamed of industries have arisen out of the idea of your youth, and in the wake of your discovery wealth and power have come to millions of your fellow-men. In these gains of knowledge the people of all lands have shared, and science has thus knit the nations in new bonds of amity. In this service of science to humanity we desire to recognize your quickening initiation.

Pioneer in research and industry, you have led the way to new realms, and your colleagues wish to testify to you that your long life of ordered service has been to them an ideal and an inspiration.

Your admirers note with pleasure the happy union of scientific investigation and practical administration in your long and useful career. You have given to science the allegiance of a noble life, and you have not allowed the seductions of wealth to abate the loyalty of your devotion to truth and knowledge. This is an example for which the age owes you unstinted thanks. But it is not your only claim to the gratitude of man. You have translated knowledge into new arts of life, and have proved that devotion to science is a qualification for success in the affairs of the world.

Society has known scientists who have not been administrators, and many " captains of industry " who have not been scientists. It is your great distinction to have been at once a true son of science and a creator of new industries, and to have shown that the trade and commerce of the future must not depend on chance or luck, but on systematic research and ordered knowledge.

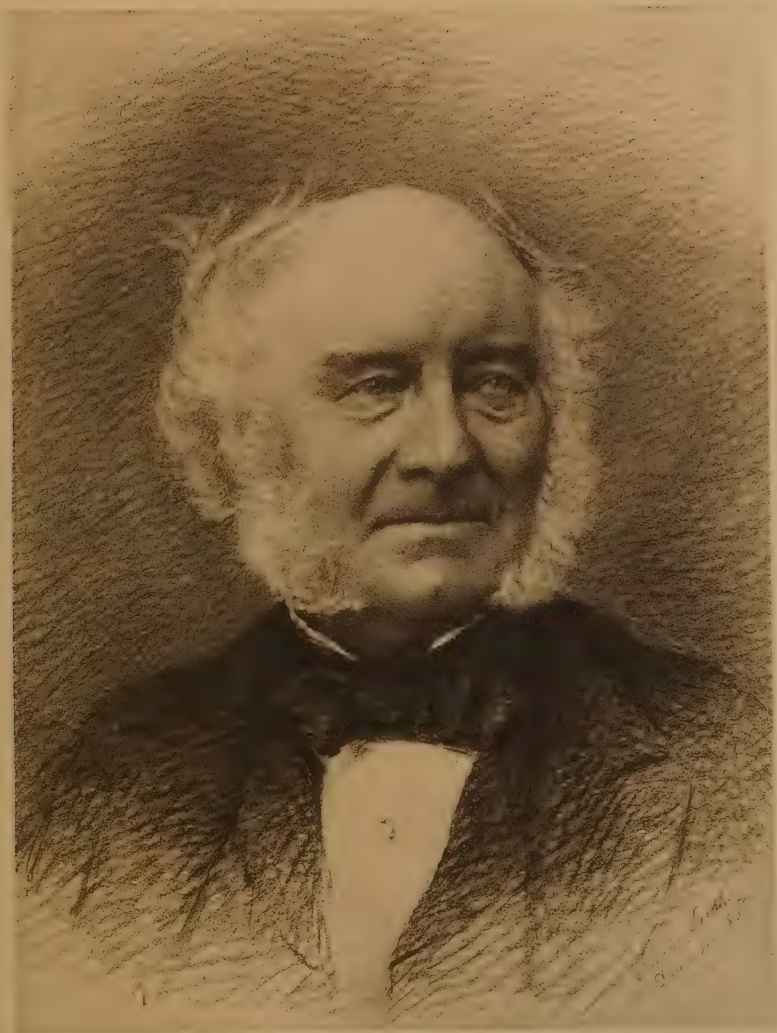
Amid these varied activities it is pleasant to know that you have cultivated the full humanity of life. Music and Art have found in you a devoted disciple, and in the family and social relationship of life you have shown that science gives a truer interpretation of, and a deeper meaning to, all that is sacred and good in the heart of man. And your colleagues, looking back on your 50 years of honourable service in the cause of science, will pray that the sunset hours may be made yet more beautiful for you in the widening glory of " That light that never was on sea or land."

Signed for the Society of Dyers and Colourists,

THOMAS WARDLE, President.

July 18th, 1906.

ERNEST T. HOLDSWORTH, Hony. Secretary.



G. F. Perkins.

Born, 1802.

Died, 1865.

SIR WILLIAM PERKIN.—Thank you for your remarks, Sir Thomas Wardle, and I also thank your Society for this beautiful address. I have reason to remember Bradford, the headquarters of the society, for when the colour was first introduced the dyers there had great difficulty, or were unable to succeed in dyeing mixed fabrics of cotton and wool with it. That necessitated my going to Bradford, and I spent two weeks in Ripley's works and was able to show them how it could be done successfully. (Cheers.) I have every reason to remember Bradford in connexion with my technical work. Thank you very much.

PROFESSOR SMITHELLS said,—Sir William Perkin, I have been deputed to bring this address and to present the homage and congratulations of the

UNIVERSITY OF LEEDS,

where, as you will know, special attention is given to that branch of applied science to which you have made such splendid contributions, and where we consider ourselves fortunate in having the co-operation of one of your distinguished sons. (Cheers.)

To SIR WILLIAM HENRY PERKIN, F.R.S., LL.D., Ph.D., D.Sc., V.P.C.S.

On the occasion of the fiftieth anniversary of the foundation of the Coal-Tar Colour Industry, the University of Leeds takes the opportunity of offering to the founder its hearty congratulations.

The manufacture of artificial dyes may be reckoned to-day among the great industries of the world. It originated in your discovery of mauve in the year 1856, when you were a young student of the Royal College of Chemistry under its first great teacher, Professor Hofmann.

Not content with a scientific study of this beautiful colouring matter, you had the foresight to recognize its practical utility as a dye and the requisite skill and resource to realize its production on a commercial scale. You were therefore the founder of the industry in a twofold sense, being both the discoverer of the first artificial dye and the pioneer in a new and unexplored field of applied chemistry.

But your energy and enterprise were not restricted to the successful production of a single new dye-stuff. The industry owes to you the manufacture of many other dyes, especially that of artificial alizarin, which you were the first to produce in this country. Nor have the applications of chemical science to industry been the only fruit of your labours. Your numerous researches in the region of pure chemistry have placed you in the forefront among men of science, and have earned for you some of the highest distinctions which English and foreign scientific societies can confer.

If there is one matter for regret in connexion with this interesting anniversary, it is that the lesson of your life's work has been learnt more slowly by ourselves than by other nations. You have taught us, what we have been too slow to realize, that a scientific industry can only flourish and expand in the vitalizing warmth of new scientific knowledge.

SIR WILLIAM PERKIN.—Thank you very much for this address from the University.

MR. J. W. HELPS.—Sir William Perkin, on behalf of the

INSTITUTION OF GAS ENGINEERS,

and representing the gas industry, I have the honour and pleasure to ask your acceptance of this address. I will not read it. I will simply refer to the concluding paragraph, which expresses the hope that you may have many years in front of you to continue the work of research and investigation to which so many years of your life have been devoted. (Cheers.)

The address is as follows :—

THE INSTITUTION OF GAS ENGINEERS.

To WILLIAM HENRY PERKIN, LL.D., Ph.D., D.Sc., F.R.S.

The President, Council, and Members of the Institution of Gas Engineers desire to join in offering to you their hearty congratulations on this the occasion of the celebration of the Fiftieth Anniversary of your discovery of the first Coal-Tar Colouring matter, Mauveine, a discovery which has exerted a marked influence on Chemical Manufactures generally, and is of especial interest to all associated with the Gas Industry.

They recall with pleasure the fact that the Institution has already expressed its indebtedness to yourself by enrolling your name on the list of those to whom its Birmingham Medal has been awarded for originality in connection with the manufacture and application of gas, interpreted in its widest possible sense.

They trust that many years of health are still before you to enable you to continue the work of Scientific Investigation to which your life has been so usefully devoted.

Sealed by order of the Council of the Institution of Gas Engineers.

CHAS. HUNT, President.

J. W. HELPS, Hon. Secretary.

WALTER T. DUNN, Secretary.

SIR WILLIAM PERKIN.—This is not the first time your Society has honoured me. I thank you very much for this address.

PROFESSOR DR. SCHULTZ then presented Sir William Perkin with the Doctor's diploma of the

TECHNISCHE HOCHSCHULE

of Munich. He said :

Sehr geehrter Herr Perkin !

Die Königliche technische Hochschule in München hat Sie, verehrter Herr Perkin, in Anbetracht Ihrer hervorragenden Verdienste um die Wissenschaft und Industrie zum Doctor der technischen Wissenschaften ehrenhalber ernannt. Ich gestatte mir hiermit, Ihnen das Diplom über diese Ernennung zu überreichen.

The CHAIRMAN.—That concludes the presentation of the formal addresses. I will now ask Dr. Bernthsen to be good enough to say a few words on the development of the industry. (Cheers.)

HOFRATH PROFESSOR DR. A. BERNTHSEN, speaking in English, said,—Mr. President, Sir William Perkin, ladies and gentlemen, I have been invited by the committee to join this imposing array of men who have come from all countries in Europe to congratulate Sir William Henry Perkin. I take it that I am expected to express to Sir William on this auspicious occasion the congratulations of the Coal-Tar Colour industry. It is with great satisfaction that I fulfil this duty. Mankind always has a tendency to take the present situation as a quite natural one, without asking much for the why and the wherefore. We find it natural nowadays to have at our disposal the most beautiful dyestuffs, representing every delicate tint of the rainbow. Again, we are quite accustomed to the fact of being able to classify systematically this enormous number of compounds, to know the chemical constitutions of nearly all of them, and to construct the dyestuff molecule like an architect making use of hypothetic atomic groups as if they were really existing. Therefore, even those who, like myself, have for a period of more than 30 years devoted their activity to the Coal-Tar colours, both in the research laboratory and also in the industry itself—the former as Professor at the University, the latter as a member of a renowned coal-tar factory—even those, I say, find a certain difficulty in representing to their minds the state of affairs at the time when Sir

William made his great discovery. The wonderful genius of Kekulé, whose theory at once put into clearest connexion thousands of isolated chemical facts, found out in the silent atmosphere of a purely scientific research, culminated only nine years later. The laboratory of A. W. Hofmann in the Royal College of Chemistry, it is true, spread a bright light of theoretical knowledge through England and the world generally, and increased to an enormous extent the bulk of theoretically interesting chemical facts; but more than once the rays of eventually coloured matters had illuminated Hofmann's pioneer path without inducing him to extend to them his researches. On the contrary, one was inclined not to approach too intimately the region of aromatic substances without the help of the decolorising charcoal. At such a time, Sir William Perkin found his mauve, as a product of oxidation of aniline. (Cheers.) In Sir William there was present the practical ingenuity which distinguishes his nation, and he immediately asked, "What is this product good for?" and he found out its excellent dyeing properties on the fibre; and then he immediately knew the way to overcome all difficulties of manufacturing which were, as I said before, much more serious than we nowadays can appreciate. Thus the industry of aniline had first to be created before beginning his work. And when Sir William was in the happy situation to enjoy the fruits of his labour his greatest satisfaction was that he, at the same time, was able to devote his time also to purely scientific work, so we may say that he has been in chemistry the real ideal type of a man joining practical work with scientific elaboration. (Cheers.) The impulse given by him has continually exercised its influence up to the present time, and if the great Coal-Tar industry has to put on record the nearly innumerable number of its collaborators and stars, it gratefully puts the name of William Henry Perkin at the top of this list, and it is delighted to take the opportunity afforded to-day to offer to you, Sir William, its sincerest and heartiest congratulations. (Cheers.)

GEHEIMRATH PROFESSOR DR. C. LIEBERMANN also delivered a congratulatory speech. He said:—

Meine Damen und Herren!

Hochverehrtester Herr Jubilar!

Mit Recht ist an die Spitze des "Coal Tar Colour Jubilee" der Name und die Ehrung des Dr. W. H. Perkin gesetzt worden. Ein halbes Jahrhundert ist verflossen, seit Perkin sein Mauve entdeckt, und damit die Welt mit dem ersten Gliede einer Klasse von Farbstoffen von ungeahnter Schönheit und Farbenpracht beschenkt hat. Noch höher als diese, wenn auch höchst wichtige, so doch immerhin mehr zufällige Entdeckung steht das Verdienst Perkins, als blutjunger Mann von 18 Jahren mit seltenem Scharfblick sofort die ganze Tragweite seiner Entdeckung erkannt zu haben und durch keine Schwierigkeit zurückgeschreckt, mit der technischen Findigkeit und Zähigkeit, die beide eine Volkseigenthümlichkeit des Engländers sind, diese Erfindung zur technischen Vollendung gebracht zu haben. Die von Perkin gelösten Schwierigkeiten werden erkennbar, wenn wir uns erinnern, dass es damals noch kein technisches Benzol und Nitrobenzol gab, und beider Technik neu zu schaffen war.

Vom Entdecker eines Farbstoffes, wurde Perkin so zum erfolgreichen Erfinder, und sein "Mauve" das Saamenkorn, aus dem jene grosse Industrie der Theerfarben erblüht ist, welche dem freudigen Farbensinn der Menschheit einen neuen Aufschwung gegeben hat.

Diese, Perkin eigene, wundervolle Vereinigung von wissenschaftlichem und technischem Können, fand sich im weiteren Verlauf der Farbstoffchemie nicht immer in einer Person vereinigt. Da war es ein grosses Glück, dass Perkin's grosser Lehrer, unser deutscher Landsmann, A. W. Hofmann, hier unter Ihnen lebte und von Perkins Erfolgen und Englands praktischem Geiste erfüllt, geradezu die Lehre aufstellte und sie eifrigst selbst bethätigte, dass chemische Wissenschaft und Technik

stets, sich unterstützend und ergänzend, Hand in Hand gehen sollen. So erstanden der Wissenschaft gleichberechtigte technische, und der Technik, wissenschaftliche Mitarbeiter.

Die Geschichte der Anilinfarben, der Synthese des Alizarins, der Azofarben, und "last not least" des künstlichen Indigo zeigen das Erfolgreiche dieses Zusammenarbeitens, für das es überhaupt kein eklatanteres Beispiel als die Theerfarben giebt, die wir heute feiern. Es hat die schönsten wissenschaftlichen Früchte getragen und die Theerfarbenindustrie zu dem gemacht, was sie heute ist.

An dieser Verbrüderung von Wissenschaft und Technik,—welche auch die Grenzen der Nationalität völlig verwischt, wie Sie aus den, aus allen Theilen Europa's und aus Amerika zur Mitfeier hier erschienenen Fachgenossen ersehen,—trägt der heute Gefeierte seinen voll bemessenen Antheil. Ein Blick über seine gesammte, 50-jährige Lebensarbeit zeigt dies auf's deutlichste.

Und zu diesem vorbildlichen Antheil an dem Zusammenarbeiten von Technik und Wissenschaft möchte ich,—als einer der Vertreter der wissenschaftlichen Farbenchemie,—hier Sir William den lebhaftesten Glückwunsch aussprechen. Mögen ihm noch viele Jahre erfolgreichen Wirkens für Wissenschaft und Technik beschieden sein !

SIR WILLIAM PERKIN, who was again loudly cheered, said :—Mr. President, my lords, ladies, and gentlemen,—I am glad that this meeting is taking place in this Institution, which I first visited 54 years ago, and for several successive Saturday afternoons sat up in that gallery an eager listener to some lectures which were being delivered. I was a schoolboy of 14 then, and my old schoolmaster at the City of London School, Mr. Thomas Hall, to whom I owe very much, who was interested in me on account of my great liking for science, induced me to write to that great and good man Michael Faraday, who was about to give a series of lectures on electricity, telling him how much I should like to be allowed to attend them, and he very graciously sent me an order (written in his own hand) admitting me to the course. I little thought then that in four years' time I should be the fortunate discoverer of the mauve dye, a product which in an indirect way is related to Faraday's scientific work, for it was in 1825 that Faraday discovered benzene which, as is well known, has been the initial product for the production of aniline from the commencement of the Coal-Tar Colour industry, and of course for the mauve. This fact also connects the industry with the Royal Institution, because it was in this building that Faraday by his researches discovered benzene. And, further, I little thought that in a few years' time (May, 1861) Faraday himself would come to the Chemical Society, as he did, to hear me give a lecture "On Colouring Matters Derived from Coal-Tar," and then encourage me by his remarks. These were all things that naturally never entered the mind. How much less could I have dreamed that 50 years after I had obtained the mauve I should be here at a golden jubilee celebration of the discovery of this dye. (Cheers.) And, moreover, who could have formed any idea of the wonderful development of the coal-tar colour industry that exists to-day, started from such small beginnings, but which through the researches of an army of scientific men is now of such colossal magnitude. When this year opened I received a new year's card from my old friend Hofrath Dr. Caro, whom I am delighted to see here to-day (cheers), in which he referred to this year as being the golden jubilee of this industry, and I thought it very kind indeed of him to have remembered it, but I little thought that I should hear any more about the matter, and not until a short time before the meeting which took place at the Mansion-house was I privately told that something was going to be done, and to-day is the consummation of this "something." (Hear, hear.) And I feel the very great honour which is being done me, but what I appreciate most deeply is that this jubilee celebration is an international one in which nations on both



T. D. Perkins.

Born, 1831.

Died, 1891.

sides of the globe are taking part. (Cheers.) I do indeed feel greatly honoured by the gifts I have received and by the very numerous addresses from the learned and other societies, and also by the very kind congratulatory speeches that have been delivered by such eminent men, and I do not know how to express myself adequately, and regret that time has prevented me from referring to them more fully. But, ladies and gentlemen, I feel that I cannot take all this honour to myself. There are others who deserve much of it, but are no longer with us. I refer to my late father and brother. They joined me when this industry was first started (the firm being known as Perkin and Sons). My father, who was a builder, was much disappointed when I took to chemistry, as he wished me to be an architect, but nevertheless when I obtained the mauve he risked most of the capital he had accumulated by a life of great industry in building and starting the works at Greenford Green (evidently having great confidence in me). This was indeed a very noble act on his part, for which I have always felt very grateful, for had it not been for this I probably should not have been able to start this industry, as few would have been inclined to undertake the risks connected with the manufacture of such a new and untried product as the mauve dye then was. My father lived about nine years afterwards, and fortunately was rewarded by seeing the undertaking a success. My brother, Mr. T. D. Perkin, who was expected to follow my father's business, helped me in my first small manufacturing operations before the works were commenced. He afterwards conducted the commercial part of the undertaking with great assiduity, and also took a practical part in the works with great success, and we worked together harmoniously for seventeen years, until the works were sold in 1873. Therefore it will be seen to what a great extent the collaboration of my father and brother had to do with the early success of this industry, and consequently I feel that much of the honour so lavishly given me to-day should be accorded to them. It is certainly a very interesting coincidence that the President of the Chemical Society should this year be Professor Meldola (cheers), one who has had so much practical experience in connexion with the Coal Tar Colour industry and has enriched it by his own discoveries of colouring matters as well as by his researches, which have yielded much valuable information in connexion with the scientific side of the industry. He has taken, I know, a most laborious and active part in connexion with this jubilee, and I thank him most heartily for all his kindness, as well as that of all others who have assisted in this matter. There is one matter connected with this industry and its great development which is of interest, and that is the immense amount of employment it has created for men of all classes, and, of course, especially for the working classes. When one considers its ramifications and its influence on other industries, it is difficult to gauge this, but it is often a very pleasant thought to me, and I am also very glad to know that the comfort and well-being of the *employés* of some of the largest works abroad are studied by the principals and suitable dwellings provided for them. And, of course, the end result of all our work should be the benefit of mankind. (Hear, hear.) But when I look upon all the great results that have been obtained chiefly by the accumulated labours of scientific men, both inside and outside the works, and the skill of those who have assisted to carry out their discoveries, while I am thankful that I had to do with the beginning of this industry, yet I cannot but feel how humble a part I have taken in this matter, and how generous and kind all are in connexion with this celebration in recognizing my early labours and struggles. I might say much more, but I feel I must conclude. This manifestation of the honour you wish to do me, of the kindness and friendly feeling you have shown me, this gathering together of friends from far and near, some of them very old friends, is very gratifying to me at this period of life, when the sun is declining in the west and the evening is approaching, and I

cannot but again reiterate how deeply I feel all that has been done, and again thank you most heartily. At the same time, when I look back on my life and consider all the way I have been led, above all I thank God, to Whom I owe everything, for all His goodness to me, and ascribe to Him all the praise and honour. (Loud cheers.)

PROFESSOR A. G. GREEN : Mr. President, my Lords, Ladies, and Gentlemen,—It is my pleasing duty to propose a hearty vote of thanks to the chairman and managers of the Royal Institution for allowing us the use of this historic hall for our meeting. (Hear, hear.) Professor Meldola has said that we could not have had a more fitting place in England in which to celebrate this Jubilee. I think we might go further, and say that we could not have had a more fitting building in the whole world. (Hear, hear.) Here, in this theatre, was the workshop of Davy, Faraday, and Tyndall—the place where, also, our revered master, Hofmann—revered as much in England as in Germany (cheers)—often lectured. Here where the soil had been prepared, and Sir William Perkin sowed the seed by his discovery of mauve, it is surely fitting that the harvest should be commemorated. (Cheers.) Professor Meldola has already referred to the fact that Faraday isolated the first sample of benzene in this building, and the sample which we have here on this table will be, I think, looked upon with the utmost veneration by those now accustomed to deal with benzene in tens of thousands of gallons. (Hear, hear.) It is possible that, 50 years hence, another such meeting may be held, but I think we may confidently expect that the progress which will then have to be chronicled will not compare in interest or wonder with that of the years that have passed from the discovery of this small sample of benzene to the development of the Coal Tar Colour industry at the present day. (Cheers.) I have the greatest pleasure in asking you to pass a hearty vote of thanks to the chairman and managers of the Royal Institution for their kindness in allowing us to meet here. (Cheers.)

The CHAIRMAN : This motion, I think, does not require any formal adoption. I am sure that Sir James Dewar will convey this message to the chairman and managers at their next meeting. (Cheers.)

The proceedings then terminated.

The following addresses were received by Sir William Perkin at a later date :

The

SYDNEY SECTION OF THE SOCIETY OF CHEMICAL INDUSTRY
presented Sir William Perkin with an illuminated address, as follows :—

1856-1906.

Sydney, 28th June, 1906.

To

W. H. PERKIN, Esq., F.R.S., LL.D., D.Sc., Ph.D., V.P.C.S.

Dear Sir,—The Chairman and members of the Sydney Section of the Society of Chemical Industry beg to tender to you their cordial congratulations upon the occasion of the Jubilee of your discovery of the Coal Tar Colours.

The members of this Section, although so far removed from the great centres of scientific thought and work, are well acquainted with and fully appreciate the great and lasting value of your scientific achievements.

They sincerely hope that health and strength may be continued to you, and that you may long enjoy the pleasure of labouring for the advancement of chemical knowledge.

We are, dear Sir, yours truly,

A. LIVERSIDGE, Chairman.
T. W. WALTON, Secretary.



26 Luglio 1906
celebrandosi per unanime consenso di gratitudine
di chimici ed industriali d'ogni paese
il 50° anniversario
della feconda scoperta della malveina
primo fondamento dell'industria dei colori d'anilina
ed impulso potente alle ricerche ed al progresso
della chimica organica
le Società chimiche italiane
interpretando i sentimenti di tutti i chimici
porgono all'illustre scopritore
Dottor GIULIO DONATI PERKIN
il tributo della loro riconoscente ammirazione.

Per la Società chimica di Milano
Il Presidente *G. Biondi*
Il Segretario *A. Biondi*

Per la Società chimica di Genova
Il Presidente *V. Biondi*
Il Segretario *L. Biondi*

Per la Società chimica di Torino
Il Presidente *F. Biondi*
Il Segretario *P. Biondi*

Italian Address

The
CHEMICAL SOCIETIES OF ROME, TURIN, AND MILAN
 sent a beautifully illuminated address framed in walnut. (See plate facing page 30.)

An address sent by the
TOKYO CHEMICAL SOCIETY
 was as follows :—

To WILLIAM HENRY PERKIN, Ph.D., LL.D., F.R.S.

The officers and members of the Tokyo Chemical Society desire to offer you their cordial congratulations on the occasion of the jubilee of your discovery of Mauve, and to express their great appreciation of the important services you have rendered to chemical industry and chemical science.

The officers and members of the Tokyo Chemical Society recognize the immense value of your discovery of Mauve, it having, on the one hand, laid the foundation of the Coal Tar Colour Industry, the vastness and importance of which can hardly be over-estimated, and which, in turn, has given rise to numerous collateral industries of much importance, and, on the other, given a great stimulus to the study of pure organic chemistry, which has thereby become a science of a truly formidable magnitude.

To this immense and rapid growth of pure organic chemistry you have yourself contributed very largely by conducting important researches in which, and in your exhaustive study on Magnetic Rotation, the officers and members of the Tokyo Chemical Society find examples of careful and patient work. These afford them also evidences of your unwearied and unselfish devotion to the cause of science, for which they feel they cannot sufficiently express their sense of admiration and respect.

It is the fervent wish of the officers and members of the Tokyo Chemical Society that you may long enjoy health and happiness, and that you may devote yourself to the further advancement of knowledge with an unimpaired activity.

On behalf of the Tokyo Chemical Society,
 JINTARO TAKAYAMA, President.

The
SOCIETY OF INDUSTRIAL CHEMISTRY OF TOKYO
 sent an address (see plate facing page 32), of which the following is a translation :—

To DR. W. H. PERKIN, F.R.S.

On behalf of the Society of Industrial Chemistry, Tōkyō, Japan, I wish to express my heartiest congratulations on the fiftieth anniversary of your eminent discovery of the dyestuff "Mauve," the first artificial colouring matter ever produced from coal-tar.

The discovery has laid the foundation of the coal-tar colour industry which has now grown to such an extent that almost all natural dyestuffs which were formerly considered to be invaluable in dyeing have now been replaced by hundreds of artificial colouring matters, and methods of dyeing have been completely changed from empirical arts to branches of applied science.

The discovery has, at the same time, given an immense stimulus to the study of pure organic chemistry, especially that of aromatic compounds by which not only the coal-tar colour industry, but several other allied industries, have been newly developed.

We thus recognize the great services you have rendered to chemical industry and science.

While congratulating you on the Jubilee of your discovery of mauve I wish, at the same time, to express my deep sense of gratitude for your valuable services to science, and hope that you may long enjoy health and happiness.

On behalf of the Society of Industrial Chemistry of Tōkyō,

VISCOUNT T. ENOMOTO, President.

July 26th, 1906.

The following letters of congratulation were received :—

(From Prof. Dr. Adolf von Baeyer to Prof. Meldola.)

München, den 25ten Mai, '06.

Arcisstr. 1.

Sehr geehrter Herr Präsident,

Gern würde ich Ihrer ebenso liebenswürdigen wie ehrenvollen Einladung zur Perkin-Feier nach London zu kommen folgen, es ist mir aber leider aus verschiedenen Gründen ganz unmöglich.

Erstens habe ich Ende Juli immer am meisten dienstliche Geschäfte, Examina und so weiter, und ausserdem gestattet mir meine Gesundheit nicht eine so weite Reise zu machen und viel zu sprechen.

In Gedanken werde ich aber lebhaft an Ihrem schönen Feste teilnehmen und werde, um dem auch einem sachlichen Ausdruck zu geben, am 7ten Juni in Nürnberg bei der Hauptversammlung des Vereines Deutscher Chemiker zu Ehren Perkin's einen Vortrag über Anilinfarben halten, in dem ich über meine neustere Forschungen auf diesem Gebiete berichten werde.

Mit der Bitte mit dieser meiner Beteiligung an der Perkin-Feier vorlieb nehmen zu wollen und mit freundlichem Grusse bleibe ich

Ihr ergebener,

ADOLF BAEYER.

(From Prof. J. W. Brühl.)

Heidelberg, July 25th, 1906.

My dear Dr. Perkin,

At this time, when the Jubilee of the Coal-tar Industry which you founded is being celebrated, I shall unfortunately only be able to be present with you in thought, as the present state of my health makes it impossible for me to undertake the journey to England. You will be convinced how deeply I regret this not only by the fact of my having joined the German Jubilee Committee in expression of my respect for you, but also because in all the years of our old friendship I have often enough had opportunity to assure you of my admiration of your personal and scientific qualities. You have, indeed, throughout your whole life been a model for us younger men of science. You have shown us what heights a "self-taught man" can attain by lofty endeavour and undaunted energy. If your name shall live for all time as that of the founder of one of the most important and beautiful of the chemical industries—an industry which to-day embraces the whole civilized world—you will also be remembered as the first man who ever called into existence a completely new and mighty industry founded on pure science. This fact—the direct and obvious proof that *pure science* forms the most fertile soil for technical and commercial progress—this truly great fact places you for all time in the first rank of the great teachers and reformers of mankind. The old prejudice that industry and technics can arise and learn only from the experience and practice of daily life, this ancient and harmful superstition you have clearly refuted to the eyes of all men. Since 1856, since the foundation of the Coal-tar

大不列顛皇國學士會員ドクトルウヰリアム・ヘンリー・
 ペルキン君貴下余ハ茲ニ日本東京ノ工業化學會ヲ
 代表シ君ガ嘗テコールタール色素ノ第一位タル
 モーヴヲ發明セラレタル第五十年紀ニ對シテ熱誠
 ナル祝賀ノ意ヲ表白セント欲ス

惟ミルニ近時コールタール色素工業漸ク發達シテ
 人造色素ノ新ニ製出セラル、モノ曰ニ月ニ多キヲ
 加ヘ從來重要視サレタル天然色素ハ遂ニ人造色素ヲ
 以テ殆ンド全ク換用セラレ隨テ其染色法ハ實驗的
 技術ヨリ進ミテ應用科學ノ範圍ニ轉移スルニ至レリ
 斯ノ如ク色素工業ノ基礎ヲシテ今日ノ鞏固ヲ得セ
 シメタルハ實ニ君ガ發明ノ賜ナリ又此發明ハ延イテ
 純粹有機化學特ニ芳香屬化合物ノ研究上ニ測ル
 ベカラザルノ動機ヲ與ヘ賴リテ以テ獨リ色素工業ノ
 進歩ヲ資ケタルノミナラズ其他之ニ關聯スル新工
 業ノ發達ヲ助成シタルモノ亦少シトセズ君ガ工業
 界及ビ學術界ニ貢獻シタルノ功績洵ニ偉大ナリト
 謂フベシ

今ヤ余ハモーヴ發明第五十年紀ヲ祝賀スルト同時ニ
 君ノ功績ニ對シテ厚ク感謝ノ意ヲ致シ併セテ君ガ
 將來益健康ニシテ幸福ナラシコトヲ祈ル

明治三十九年七月廿六日

日本東京

工業化學會會長子爵榎本武揚



Industry, the idea has become the common property of all sensible men of all nations that pure science is the safest foundation even for industry and commerce—that is to say, for the common weal. Thus the combination of routine and clumsy empiricism was broken once and for all, and theoretical knowledge and experimental power took the place of guess-work and accident.

But you were not content with attaining this high goal and the rank of an historical personage in the promotion of international production and exchange. Inspired by a noble thirst for knowledge, and endeavouring at the further perfection and extension of our knowledge of nature, you have enriched organic chemistry with a series of most brilliant experimental researches.

And finally, at an age when most men would have retired on such well-earned laurels, you undertook once more an altogether new and wide-embracing task. Availing yourself of the marvellous discovery of your great countryman, Michael Faraday, you undertook to investigate the relations between the chemical composition of bodies and their magnetic circular polarization—that is to say, one of the general properties of all matter. Before you began work there was little, almost nothing, known of this subject, certainly nothing of practical use to the chemist. You created a new branch of science, taught us how from the magnetic rotation conclusions can be drawn as to the chemical structure of bodies, and showed that the magnetic rotation allows us to draw comprehensive and certain conclusions as to the chemical constitution of substances, just as we may from another general physical property—viz., refraction and dispersion. And by showing that both these physical methods of investigation lead to completely harmonious results, you did essential service to both these branches of study, and also to chemistry, which they are destined to serve.

Let us, however, not conceal the fact that the present moment does not seem particularly favourable to the application of physical methods of investigation for chemical purposes. On the one hand the so-called *pure* chemists have not sufficient training in physics to make independent use of the physical methods. On the other hand there has come up lately in physical chemistry a school which is engaged in quite different problems and possessed of little interest in questions concerning the structure of matter. But fashions change, and the time will most certainly return, and perhaps sooner than many suppose, when it will again be generally recognized that a regular and highly instructive connexion exists, and must exist, between the physical properties and the chemical composition of bodies. And thus, certainly, the application of magnetic rotation, and of physical methods in general, will become of ever-increasing importance for chemical research.

The work of your busy life has been astoundingly many-sided and comprehensive, and crowned with brilliant success. The great British nation is rightly proud of you, her son. But William Perkin, the creator of a world-wide industry, the distinguished investigator, belongs not only to his countrymen. He has admirers in all the five continents, and in all civilized countries true friends are remembering him with veneration and affection. To count myself among these, my dear Dr. Perkin, will always remain one of the most valued privileges of my life. That you may be spared for many happy years to your family and friends, to the benefit and emulation of mankind, is the hearty wish of

Your sincere friend,

J. W. BRÜHL.

(From Prof. G. Lunge.)

Technisch-chemisches Laboratorium, Eidgenössisches
Polytechnikum, Zürich, July 6th, 1906.

Dear Professor Meldola,

I had counted upon attending the Perkin celebrations. To my greatest regret I find myself unable to visit London for that purpose. My health during the last month or so has been so poor that I shall be glad to get to the end of the term

(which coincides with the date of the Perkin festival) without a breakdown. It is unnecessary to say that with all my heart I join in the congratulations which Dr. Perkin will receive on this occasion.

Believe me, dear Professor Meldola,

Yours sincerely,

G. LUNGE.

(From Prof. Dr. Hugo Kauffmann.)

Stuttgart, den 24. Juli, 1906, Johannesstr. 74ii.

Sehr verehrter Herr !

Unter der Fülle der Gratulationen, die Ihnen dieser Tag bringt, sei es auch mir vergönnt, Ihnen meine herzlichsten und ergebensten Glückwünsche zur heutigen Feier darzubieten. Wir verehren in Ihnen nicht nur den Mann, der durch die Begründung der Farbenchemie der industriellen Entwicklung der Länder zu grosser Blüte verhalf, sondern auch den Forscher, der durch nie rastenden Fleiss der Natur ihre Geheimnisse zu entlocken vermochte. Ihre klassischen Arbeiten über die magnetische Drehung der Polarisationssebene des Lichtes, die zur Entdeckung höchst auffälliger Anomalien bei aromatischen Stoffen führten, sind ein Lebenswerk ersten Ranges und wunderbar ist es, dass diese Erfolge, die auf ganz anderem Gebiete zu liegen scheinen, doch wieder mit der Farbenchemie verfliessen. Schaffen doch Ihre Messungen die Möglichkeit, die auxochrome Kraft der Atomgruppen zahlenmässig anzugeben ! Ich persönlich fühle mich besonders zu grossem Danke verpflichtet, da Sie vor einigen Jahren die Liebenswürdigkeit hatten, mir bei der Konstruktion des magneto-optischen Apparates in so freundlicher Weise behilflich zu sein. Indem ich Ihrem Jubeltage den schönsten Verlauf wünsche, bin ich

mit vorzüglicher Hochachtung,

Ihr sehr ergebener

HUGO KAUFFMANN.

(From Prof. Dr. Hugo Schiff, R. Istituto di Studi Superiori, Firenze, Laboratorio di Chimica.)

Florence, July 22nd, 1906.

Dear Colleague,

I beg to present my best wishes and sincere felicitations for your and the aniline purple's jubilee. Certainly few chemists have the good fortune to be still, as I am, in possession of an original bottle of "Perkin and Sons' Patent Aniline Purple," and to demonstrate in my lectures the tinctorial power with the original preparation, brought away on the occasion of the London Exhibition of 1862. Your modest first chemical works of 1858, are also shown in my lectures by the picture contained in your publication on alizarin, which you had the kindness to send me in 1879.

I hope you will survive by a good many years your actual jubilee and find a second youthhood in that of your able sons, and the continuation of their important researches.

With sincere congratulations and salutations, I remain, Dear Sir,

Obedient and faithfully yours,

HUGO SCHIFF.

(From Prof. Dr. Otto N. Witt.)

Berlin N.W. 23, Siegmundshof 21, July 20th, 1906.

Dear Dr. Perkin,

I have just received your and Mrs. Perkin's kind invitations, for which I hasten to offer my thanks. I am extremely sorry for being unable to be personally present on the occasion of your jubilee. You know that since more than thirty years I have entertained a sincere regard for you, and that I was always delighted when after long intervals I could shake hands with you.

As I told Meldola and the others from the beginning, I am quite unable to visit London in July of this year. If they had only laid your memorial *after* the York meeting I would have been delighted to come.

As things are I can only by letter wish you on this occasion everything that is good and agreeable. I am sure you will feel proud and happy on the 26th, and you certainly deserve it!

Believe me, my dear Dr. Perkin, very sincerely yours,

OTTO N. WITT.

(From Prof. E. Noelting.)

Mulhouse (Alsace), July 24th, 1906.

Dear Dr. Perkin,

I should have been very pleased to come over to England in order to present you personally my best wishes for the fiftieth anniversary of your pioneer discovery. Unfortunately I am not free, having the final examinations at my school, and so I can only assist in mind at the meeting of scientific men who will congratulate you on this solemn day.

I hope that you will have still many years of life and health, and that you will continue for a long time to give your valuable contributions to our beloved science.

I remain, dear Dr. Perkin, yours very faithfully,

EMILIO NOELTING.

(From M. Charles Lauth, Directeur honoraire de l'Ecole de Physique et de Chimie Industrielles de la Ville de Paris.)

Monsieur Arthur Green.

11 Juillet, 1906.

Cher Monsieur,

Je reçois ici votre aimable invitation et je vous exprime les regrets bien sincères que j'éprouve d'être empêché de me joindre à nos confrères qui se réunissent pour honorer l'illustre fondateur de l'industrie des matières colorantes du goudron de houille.

Tous ceux qui, comme moi, ont suivi les traces de Perkin, qui ont consacré leur temps et leur intelligence au développement de cette industrie, lui ont voué une profonde reconnaissance.

Pour nous rendre compte de la grandeur des services qu'il a rendus, il faut nous reporter par la pensée au moment où il jeta dans le monde la graine féconde qui a donné naissance à tant d'admirables produits. A part la murexide qui, pour la première fois, venait de montrer le parti qu'on pouvait tirer dans la teinture et l'impression des produits préparés artificiellement dans le laboratoire du chimiste, nous étions absolument tributaires des colorants fournis par la nature.

On savait bien que l'aniline donnait, sous l'action des agents chimiques, des

colorations variées, mais nul n'avait songé à en tirer parti. Perkin, lui-même, semble-t-il, visait un autre but lorsqu'il étudia l'action du bichromate de potassium sur l'aniline, mais il a eu l'immense mérite d'examiner à fond cette réaction, d'en purifier les produits, d'en extraire le magnifique violet qui, à juste titre, porte son nom, et de deviner l'intérêt industriel qui découlerait de son travail. Les qualités que nous admirons en Perkin sont rares aujourd'hui ; combien de fois les faits les plus importants ont-ils échappé aux chimistes parce qu'ils n'ont su apporter, dans leurs expériences, la sagacité et la patience de celui que nous fêtons aujourd'hui. Honneur donc à lui ! Puissent ses successeurs s'inspirer de son exemple.

J'apporte de loin mon hommage respectueux à ce savant illustre et je me joins à tous ceux qui fêtent en lui un représentant de notre " Entente Cordiale."

Veuillez agréer, cher Monsieur, l'expression de mes meilleurs sentiments.

CH. LAUTH.





GREENFORD GREEN WORKS, 1858.



THE WORKS IN 1873.

Banquet to Sir William Perkin.

A complimentary banquet was given to Sir William H. Perkin in the evening of the same day, at the Whitehall Rooms, Hotel Métropole. The chair was occupied by Professor Meldola, F.R.S., and there was a large and distinguished company, including H.S.H. Prinz Wilhelm zu Stolberg-Wernigrode (representing the German Embassy), the Right Hon. R. B. Haldane, M.P. (Secretary of State for War), Lord Alverstone (the Lord Chief Justice), Lord Halsbury (the ex-Lord Chancellor), Lord Kelvin, Lord Justice Fletcher Moulton, Lord Rayleigh, the Consul-General of the United States, and Sir William Broadbent.

The CHAIRMAN, rising after dinner, said,—The first toast I have the honour to submit is that of “His Majesty the King.” (Cheers.) This toast requires no persuasiveness on my part to commend it to you all with loyal enthusiasm, nor will it be received, I am sure, at this great international gathering with less cordiality than among an assemblage of Englishmen, for the name of his Majesty the King is emblematic of peace, amity, and good will among the nations. (Cheers.) Your Highness, my lords, and gentlemen, I will ask you to drink to the health of His Majesty the King. (Cheers.)

The CHAIRMAN, again rising, said,—The next toast which I have the honour to submit will, I feel certain, be received with no less cordiality. It is that of “Her Most Gracious Majesty the Queen, the Prince and Princess of Wales, and the other members of the Royal Family.” Gentlemen, I submit this toast. (Cheers.)

LORD HALSBURY.—My Lords and Gentlemen, I have had imposed upon me the duty of proposing for your acceptance the next toast. It is that of “The Rulers of Foreign Nations,” and you might well be appalled at the prospect before you if it formed part of my duty to go through the list of the different rulers, attributing to them the praise or blame which might be considered, for the moment, to be their due. (Laughter.) I am happy to inform you that that is not a part of my duty. We treat them as abstractions, and I am happy to believe that, in these days, foreign rulers are more occupied in looking after their own affairs than in considering those of their neighbours (laughter), and I am happy to believe, also, that we as a rule take the same view, and look after our own affairs and not after those of our neighbours. As a distinguished professor at my side told me early in the evening, chemistry belongs to the whole world. (Hear, hear.) And the great federation of mankind is better employed, and, in fact, more employed in these days in examining the secrets of nature and those things from which we can reap profit to ourselves, than in considering what we sometimes seem to think more important—the politics of the world. (Laughter.) I heard a description of one place, which was supposed to be an ideal place of happiness, in which the only thing they thought of was science and art and beer. (Laughter.) Whether they do arrive at that great consummation or not I cannot say, but I must say one word on behalf of those who silently carry on the work of investigating the secrets of nature, that more than once, in the history of mankind, these silent students have changed the face of nature. I was going to add, only it might be supposed to be a covert allusion to our guest to-night, that at

all events they had changed the colour of its face. (Laughter.) Well, gentlemen, I apologize for having taken up so much of your time. I propose the health of "The Rulers of Foreign Nations." (Cheers.)

The CHAIRMAN.—Your Highness, my Lords and Gentlemen, my duty is now simply to convey to the meeting certain messages of congratulation, or of apology and regret, which have been received. In the first place we have received letters of regret from his Excellency the French Ambassador, Mons. Cambon (cheers), who is not able to be with us to-night; from his Excellency Count Metternich, the German Ambassador, who is not with us, but who is ably represented by Prince Wilhelm zu Stolberg-Wernigrode (cheers); from his Excellency the Hon. Whitelaw Reid, the American Ambassador; and from his Grace the Duke of Northumberland, from the Right Hon. A. J. Balfour, from Lord Avebury, from Sir Owen Roberts, and Professor Attfeld. Sir Lauder Brunton has telegraphed to Sir William Perkin :—"Sincerest regret for inability to be present. Heartiest congratulation and best wishes for long life, health, and happiness." (Cheers.) There is also a cablegram from New York in these terms :—"Perkin Jubilee, Whitehall Rooms, Hotel Métropole. Greetings from America. Long life and happiness to Perkin and family.—American Perkin Committee, signed Chandler and Schweitzer." The Chairman proceeded to read a number of other congratulatory messages, and Sir William Ramsay also read several Italian telegrams of congratulation to Sir William Perkin. (See page 7.)

Mr. HALDANE, M.P., who was cordially cheered, said,—Professor Meldola, your Highness, my Lords and Gentlemen, I rise to give you a toast which, I think, is in substance, whether in form or not, the toast of the evening. There was a great controversy, which took place a good many years ago now, between two of the most distinguished men of letters in modern Europe. Ernest Renan wrote to David F. Strauss on the outbreak of the war of 1870, and those who have perused those most brilliant letters can have derived from them but one impression and one sense, and that is, whatever may be said, the interests of science are wider than the interests of any nationality, however great. When it is a question of science we are all cosmopolitan, we are all brothers (hear, hear), and so it comes about that this assemblage is not English, is not French, is not German, is not American, is of no nationality. It has come here to do honour to one man. (Hear, hear.) And that is nothing new. We in England are proud of your great men abroad. We rejoice that the world has the record of Laplace, of Lavoisier, of Berthelot, of Helmholtz, of Hofmann, and of Fischer. (Cheers.) We know and love the name of Leibnitz, of Mendeléeff, of Bruno, and of Galileo, and we are proud of Goya and of Renan, because men like these have contributed, not merely to their own nation's wealth, but to the wealth, learning, and talent of the world at large. (Cheers.) And so it is that we, and our men of science, have joined with you who have come from beyond the seas to do honour to-night to one man. I have often thought that you who come from abroad, with your magnificent organizations and the extraordinary capacity your Governments show in excess of ours in taking care of science—I have often thought that it must strike you as somewhat odd to see the way in which we attend to these things in this country. (A voice.—"Or do not attend.") But, although we may be deliberate, we do attend to them in the end. We are a very practical nation, and if we muddle through, yet we do muddle through somehow. (Laughter and cheers.) It is quite true that our State takes, in the first instance, but little interest in science. Our notion is that practice is everything. We know nothing of the great maxim that "Die Wissenschaft ist der goldene Leitstern der Praxis." But, although we do not put that forward as a maxim to which our politicians conform much—I make no exception about any Government—although we do not put that forward as a maxim, still, after all, what we do is the outcome of the genius of our people. We are a practical people, and perhaps we take as our

Professor J. Larmor <i>Secretary Royal Society</i>	Rt. Hon. Mr. Justice Buckley	Professor W. A. Tilden, F.R.S.	Dr. Leo Baekeland <i>American Delegate</i>	S. G. Latwyche, Esq. <i>Master of the Leathersellers' Company</i>	Sir Robert Pullar, LL.D.	Professor Dr. Hans Rupe <i>Swiss Delegate</i>	Rt. Hon. Lord Justice Fletcher Moulton, F.R.S.	Hofrath Professor Dr. A. Bernthsen	Sir Arthur Rucker, F.R.S. <i>Principal of the University of London</i>	Rt. Hon. Lord Kelvin, O.M., G.C.V.O.	Professor Dr. P. Friedländer	Rt. Hon. The Earl of Halsbury, D.C.L., F.R.S.	Geheimrath Professor Dr. Emil Fischer <i>President German Chemical Society</i>	Sir William Henry Perkin, PH.D., F.R.S.	Professor R. MELDOLA, F.R.S. President of the Chemical Society.	H.S.H. Prinz Wilhelm zu Stolberg- Wernigrode <i>Representing the German Embassy</i>	Rt. Hon. R. B. Haldane, M.P. <i>Secretary of State for War</i>	Professor Dr. Albin Haller <i>Membre de l'Institut</i>	Rt. Hon. Lord Alverstone, F.R.S., <i>Lord Chief Justice</i>	Hofrath Dr. Heinrich Caro	General the Hon. R.J. Wynne <i>Consul-General of the United States</i>	Rt. Hon. Lord Rayleigh, O.M. <i>President of the Royal Society</i>	Professor Dr. Carl Duisberg	Sir William Broadbent, Bart., G.C.V.O.	Professor Dr. P. van Romburgh <i>Dutch Delegate</i>	Sir Henry E. Roscoe, F.R.S.	Geheim Hofrath Professor Dr. R. Möhlau	Sir Norman Lockyer, K.C.B., F.R.S.	Professor Wm. Odling, F.R.S.
A. C. Chapman, Esq.	Dr. Hugo Müller, F.R.S.	Professor W. R. Dunstan, F.R.S.	Professor J. Ferguson, LL.D.	Dr. A. C. Chapman, Esq.	Dr. W. J. Russell, F.R.S.	Dr. A. Scott, F.R.S.	Professor W.R.E.Hodgkinson	E. Greenwood, Esq.	Dr. J. C. Cain, <i>Assist. Hon. Sec.</i>	The Times	Colliery Guardian	Professor J. J. Dobbie, F.R.S.	Professor V. H. Veley, F.R.S.	Dr. F. B. Power	Professor A. Senior														
E. Bevan, Esq.	Dr. Bernard Dyer	Dr. H. Foster Morley	Dr. G. T. Moody	T. R. Burton, Esq.	The Times	Daily Telegraph	A. J. Dickinson, Esq.	Professor E. J. Mills, F.R.S.	F. W. Pomeroy, Esq., A.R.A.	H. Hemingway, Esq.	Dr. L. T. Thorne	Dr. S. Ruhemann																	
J. C. Oxley, Esq.	Christopher Rawson, Esq.	N. H. Martin, Esq.	William Ping, Esq.	Professor E. F. Mondy	Morning Post	Daily Chronicle	Dr. H. G. Colman	Dr. H. A. D. Jowett	A. J. Greenaway, Esq.	J. Finzi, Esq.	Mr. Sterger	R. M. Walmsley, Esq.																	
S. H. C. Briggs, Esq.	W. T. Alexander, Esq.	Dr. F. E. Mathews	C. F. Barham, Esq.	Thomas Milne, Esq.	Dr. T. A. Henry	Dyer & Calico Printer	J. Bruce Millar, Esq.	A. T. Hill, Esq.	Dr. John Wade	J. W. Helps, Esq.	Dr. H. Borns	F. H. Lees, Esq.																	
J. B. Wilkinson, Esq.	Rufus D. Pullar, Esq.	Dr. Hennings	Dr. T. M. Lowry	Dr. Bunday	R. des F. Struthers, Esq.	Yorkshire Post	Chemist & Druggist	F. L. Teed, Esq.	Dr. L. F. Guttman	J. Brown, Esq.																			
E. Hickson, Esq.	F. Greville Williams, Esq.	S. Walker, Esq.	Dr. E. F. Armstrong	A. W. Perkin, Esq.	S. J. Lewis, Esq.	Dr. J. F. Thorpe	J. R. Pedlar, Esq.	Dr. H. R. Le Sueur	J. Hübner, Esq.	Dr. G. Barger																			
Thorp Whittaker, Esq.	H. Zilz, Esq.	S. Bowditch, Esq.	H. Helbing, Esq.	T. L. Taylor, Esq.	S. Hall, Esq.	Dr. E. Divers, F.R.S.	J. Christie, Esq.	E. Grant Hooper, Esq.	Dr. E. Ullrich	Dr. P. Haas																			
J. Turner, Esq.	Dr J. T. Hewitt	Dr. J. L. Heinke	R. W. Greeff, Esq.	Dr. J. A. Voelcker	Dr. E. Divers, F.R.S.	D. Bendix, Esq.	Lazarus Fletcher, Esq., F.R.S.	F. J. M. Page, Esq.	Dr. R. Bablich	Professor E. Knecht	Dr. Nieme	Dr. E. Feilmann																	
J. Y. Johnson, Esq.	Dr. E. F. Ehrhardt	Dr. F. Klingemann	Dr. A. Rée	W. Pearce, Esq., M.P.	Dr. F. Raschig	Professor Dr. B. Lepsius	Professor W. J. Pope, F.R.S.	Dr. M. O. Forster, F.R.S.	Dr. J. Lewkowitsch	J. E. Marsh, Esq., F.R.S.	Dr. G. T. Morgan	O. Guttman, Esq.																	
Dr. Adolph Liebmann	Dr. Arthur Colefax	Professor A. W. Crossley	Professor A. Smithells, F.R.S.	T. F. Blackwell, Esq.	A. G. Perkin, Esq., F.R.S.	Professor Dr. R. Messel	Professor W. H. Perkin, F.R.S.	Kenneth R. Swan, Esq.	Dr. F. M. Perkin	Direktor A. de Ridder	David Howard, Esq.	A. Mond, Esq., M.P.	Dr. C. Dreyfus																
Professor Dr. G. Schultz	Geheim Commerzienrath Dr. W. Kalle	Dr. H. Levinstein	Professor Dr. G. Kraemer	T. H. Blakesley, Esq.	Geheimrath Professor Dr. Carl Liebermann	Professor Guyot	Professor Dr. H. Erdmann	Sir Joseph W. Swan, F.R.S.	J. Gavey, Esq., C.B. <i>President Institution Electrical Engineers</i>	Edward Frankland, Esq.	A. B. Kempe, Esq.	Professor Étard	Geheimrath Professor Dr. M. Delbrück																
Professor Arthur G. Green, <i>Hon. Secretary.</i>	Sir Thomas Wardle, <i>President Society of Dyers and Colourists.</i>	Professor Henry E. Armstrong, F.R.S.	Sir William Ramsay, K.C.B., F.R.S. <i>Foreign Secretary Chemical Society.</i>	Sir James Dewar, F.R.S.	Professor Percy F. Frankland, F.R.S. <i>President Institute Chemistry.</i>	A. Gordon Salamon, Esq. <i>Vice-President Society of Chemical Industry.</i>																							

example the Goddess Minerva. She was the goddess not merely of war, but of science, and her bird was the owl, of whom it was said that the owl takes her flight only after the heat and burden of the day, when the twilight has come and then the day is painted in grey. And so it is with us, but the grey is painted, and to-night we are here to do honour to Sir William Perkin (cheers), whose work has been a great work, not merely for this nation, but for humanity at large. He mastered, and he was the pioneer in mastering, the secret of those wonderful hydrocarbons of Coal-Tar, out of which so much was to be produced—mauve, alizarin, and all those things which have been of practical utility to the peoples of the earth. Well, my lords and gentlemen, Perkin began that work. He was associated with some of the brilliant men of that time. I have often thought that, if the Prince Consort had lived, probably Hofmann would have remained in this country, and it might have been that, aided by that great spirit, the centre of the Coal-Tar industry and of all its products, and, what appeals to us so much, of the many millions which have come out of those products (laughter), would have remained in Great Britain and not have passed to Germany. It was otherwise, but we still realize and recognize the fact, of which we are proud, that the origin of that great discovery, the brain which conceived it and the talent which gave it shape and form, is with us to-night in the person of our guest, Sir William Perkin. (Loud cheers.) We do not organize in this country, we hate abstract ideas, and we put difficulties rather than encouragement in the path of the discoverer. But that notwithstanding, there is a curious quality about the British race. We have the gift of giving full scope, perhaps by reason of our very want of organization, to individuality. The man who has got it in him in this country makes his way, as a rule, to the very front just as completely as anywhere else. We may not have so many men of science as foreign nations, but we are not deficient in quality. (Cheers.) I look around and I see the proof of this thesis in those around me. Individuality has its scope among us. It forces its way forward, and when it has forced its way forward the practical genius of our people, which loves individuality, falls down and worships it, and in the end individuality is honoured. And so it comes about that, although the Coal-Tar industry has taken wings and flitted across the German Ocean, we are here, without distinction of nationality, to honour Sir William Perkin. (Cheers.) Coal-Tar, the least inviting of substances, has proved itself the most rich and fruitful. We do not dwell, as Bishop Berkeley did, on the value of Coal-Tar water, but on the value of those marvellous hydrocarbons of which Sir William Perkin discovered the secret. (Cheers.) Now, when I go to Berlin and see the great chimneys which, in other countries, would betoken some manufacturing company, but in Berlin betokens a University which has got its 12 professors of chemistry, and is investigating to-day those products, and adding discovery to discovery, and, if I may judge by the commercial records of great bodies like the Badische Anilin und Soda-Fabrik, are also adding dividend to dividend, I feel that the work which has been done, and which has changed the face of the world in certain of its departments, is a work of which we may be proud, because it was initiated by an Englishman. (Cheers.) Well, my lords and gentlemen, it is indeed a satisfaction to be here to-night. It is a gathering not "of the Clans," but, what is much better, of the nations. (Hear, hear.) It is a gathering of men who are bound together with a common thought—the thought of doing honour to one who has formed a bond in that science which goes beyond anything that belongs to a particular nation, and which is the heritage of the world. (Cheers.) No longer are we tied together by the mere links of a common language. It was all to the good that, in the Middle Ages, the scholar could travel, and could go to the Castle, behind which he passed on his horse, or if, as generally happened, he was poor, on foot, and

because he knew the common language of educated men could ask for admission and be sure of a reception. He knew Latin. To-day our bond is different. What binds our peoples perhaps more than anything else is the common bond of science. Well, my lords and gentlemen, we here are united to-night by the common bond of science, and we are here to bear testimony to the great services rendered by one who initiated a great discovery, and has left the world—the world in which he still works, and to the knowledge of which, I am glad to think, he still adds (cheers)—richer than when he entered upon his researches. I give you the health of “Our guest, Sir William Perkin.”

The toast was received with enthusiasm, the whole company rising and singing “For he’s a jolly good fellow.”

SIR WILLIAM PERKIN, who was again loudly cheered on rising to reply, said,—Professor Meldola, your Highness, my Lords, and Gentlemen,—I thank you very much for the hearty manner in which you have responded to the subject of my health proposed by Mr. Haldane, and I also thank him for all the kind things he has said about me in connexion with my work and the Coal-Tar Colour industry. Fifty years is a long period to look back upon, but it is very interesting to consider what a remarkable period it has been in reference to the development of science and industry, and how very different is the foundation and development of this industry of the Coal-Tar colours to that of the older industries. The old industries originated from observation and experience, and were also developed by these methods, the changes being mostly very slow, so that the processes were handed down from generation to generation, and, of course, there was no other way in which they could originate, there being nothing else to found them upon. They were even regarded as mysteries, as we find from the charters of the Livery Companies. Even later, when chemistry did commence to be a science, the strong conservative feeling which had grown up with these old industries was so great that attempts to apply scientific knowledge to them were looked upon with anything but favour, and even now this spirit has not been entirely eradicated, a great want of sympathy with scientific work being still manifested (in many of them) by many manufacturers. But the history of the Coal-Tar colours is of an entirely different character, as this was not based upon any of the older industries, and, therefore, there were no old-fashioned prejudices to interfere with it. The origin and foundation was the outcome of scientific research, and also its development has been due to research, hence its unique character and marvellous growth—the fruit of the union of science and industry. When I was young it was thought quite *infra dig.* for a scientific man to associate himself with industry, and the possibility of becoming a manufacturer, owing to the discovery of the mauve, made me feel this very much on account of my love for scientific work, but I determined that whatever happened, so far as in me lay, I would work at research, and I am thankful that I have been able to keep to my resolve, because in developing this industry, to the extent I had to do with it, research, and the spirit of research, were of the greatest value to me, and this belief in the importance of research took root also in others, and we see, as a consequence, the wonderful results of to-day. I remember the time when it was said that by my example I had done harm to science and diverted the minds of young men from pure to applied science, and it is possible that for a short time some were attracted to the study of chemistry from other than truly scientific motives; but this soon righted itself, and this union of science and industry has had most beneficial results, because they have been handmaids to each other in a most remarkable way, chemical science having made a progress it never could have made without the aid of this industry. The greatest chemists in the world also have been occupied with the problems related to this industry, many of which are of the deepest and most abstruse nature, and now we

also see in the colour works themselves armies of highly trained, as well as eminent, chemists incessantly at work, many occupied with research, whilst others are engaged in superintending and improving chemical operations in different departments, and this has not only been productive of the discovery of new colouring matters, but also of improving the methods in use. The discovery of new colouring matters has been most remarkable, and in the published list there are now about 700 enumerated, all obtained from Coal-Tar products, colouring matters of all kinds of shades and suitable for all kinds of purposes—and, notwithstanding the large expense of all the scientific staff employed in this industry, the colouring matters are produced at a very low cost and in a remarkably high state of purity, so that the old dye-stuffs cannot compete with them, and, in fact, many have gone out of use. By the study of the Coal-Tar colours a wonderful insight has also been obtained in reference to the colouring matters found in nature—in roots, dye-woods, petals of flowers, &c.—showing the remarkable fact that nearly all, if not all, are related to Coal-Tar products, and not only so, but it has enabled chemists to produce some of those natural colouring matters artificially on the large scale. One of these is “alizarin,” the colouring principle found in the madder root, which was cultivated very largely and formed an important industry. Alizarin was studied from a purely scientific point of view by Graebe and Liebermann, and their researches showed that it was related to a Coal-Tar product, anthracene, and could be obtained from it. Technical processes were afterwards discovered by which it could be made on the large scale, and now it is produced in immense quantities, very much cheaper and very much purer than it could be obtained from madder, so that madder growing is practically a thing of the past. And, moreover, alizarin itself has become the source of other new colouring matters, and its formation has also resulted in the production of allied colouring matters, such as anthrapurpurin and flavopurpurin, which are almost of as much importance as alizarin itself. Another natural product is indigo. The researches of that great chemist Adolf von Baeyer, in 1879, established the chemical structure of this compound, and he also found how it could be produced artificially. His process was made a technical one, but it was found too expensive a method for general application, the cost of the artificial product being too high to enable it to compete with the natural product; but the thin end of the wedge had been driven in, and in that year (1879), in some lectures before the Society of Arts, I referred to this discovery, and said, “Baeyer has shown that indigo can be produced artificially, but at present no practical means of accomplishing the manufacture have been discovered. No doubt, however, it will not be many years before this is achieved and the cultivation of the indigo plant share the same fate as the madder.” During the 27 years since this warning note was raised to the indigo growers, what has happened? The most persevering efforts have been made in connexion with this substance to find different methods of producing it, both from a scientific and technical point of view, in the laboratories of the Universities, and also in the laboratories of the colour works, where immense sums of money have been spent on this subject, with the result that what I predicted is now taking place: artificial indigo is being produced in great quantities and at a cost less than that of the natural product, so that land used for its production in India has had to be utilized for other crops. This is a most remarkable instance of the fruits of persevering scientific research, made both for its own sake and also in connexion with industry. I speak of research made for its own sake, for do not let us when we see the wonderful fruits connected with the Coal-Tar Colour industry forget that the origin of them all is research made for the sake of getting a deeper knowledge of the laws and secrets of nature. Without these researches no coal-tar colours would have been discovered, and doubtless the future cultivation of research will not only advance our higher

knowledge of things, but, judging from the past, also lead into paths yielding valuable kinds of fruit at present unknown to us. The great importance of original research has been one of the things I have been advocating from the commencement of my chemical career, in season and out of season. Some have thought that I have unduly done so, and I fear that at times my plain speaking may have caused offence, but I do not regret having been so persistent in this matter, and am glad to find the importance of research is now getting to be much more generally acknowledged than it was. From what I have said you will quite understand how glad I am that one of the fruits of this jubilee celebration is the inauguration of a research fund. Nothing could have been more to my mind, and I am glad that it is to be administered by the Chemical Society. We already have a research fund in connexion with the Chemical Society, instituted by Dr. Longstaff, and it has proved of great value to young men, and others have likewise found its assistance a great help. Chemical research is often costly, the value of the products which have to be used in the inquiries, as well as other sources of outlay, being very considerable, and therefore this new fund no doubt will be productive of much good work. I also feel greatly honoured that it is to be associated with my name. But I must now conclude, and in doing so say how greatly I appreciate all the kind and generous feeling that has been shown me by this international gathering, and also the privilege I have had of meeting so very many friends (and many very old friends), and the practical manifestation of your regard of my labours shown by the honours you have showered upon me, but when I consider what I have done in the past, and realize how imperfectly I have used my opportunities and how much better much of what I have done might have been done, I feel your kind indulgent appreciation of my labours is far beyond their value, and I can only thank you again most heartily.

SIR HENRY ROSCOE, F.R.S., next proposed "The Visitors." He said:—Many distinguished visitors from far and near are to-day honouring our celebration of the discovery of Coal-Tar colours and showing their appreciation of the scientific labours of their discoverer, Sir William Perkin. The toast which I have the honour to propose is the health of these guests, both English and foreign. We English chemists desire to thank our foreign friends for making this ceremony an international one (hear, hear)—a scientific *entente cordiale* among all nations. I see amongst our guests distinguished representatives of chemistry both pure and applied—some to whom has been given the task of wresting from Nature her secrets; some who apply these discoveries to the good of mankind—and among these I rejoice to see the face of my old friend Dr. Caro. (Cheers.) Who shall say to which of these two shall the palm be given? Both work for the good of humanity, and both unite in honouring him who wrote the first page in the marvellous history of the Coal-Tar products. (Cheers.) I first give you the toast of "Our Foreign Guests," and I couple with it three distinguished names—first, that of Emil Fischer (cheers), of Berlin, whose presence here delights us, and whose name has the sweetest of tastes in the mouth of every chemist; secondly, that of Professor Haller, from Paris, of camphor and terpene fame. (Cheers.) Amongst our English guests I have the pleasure of naming Lord Alverstone (cheers), better known to chemists as Richard Webster, whose powerful advocacy and complete mastery over complex chemical problems have often and so long been the theme of our wonder, and in whose genial presence we all rejoice. These three distinguished persons will do us the honour of replying to the toast. Would that I could add a fourth whose name comes involuntarily to one's lips—that of Adolf von Baeyer—Indigo-Baeyer. (Cheers.) He is unable to be with us, but I know that he is present in spirit, and I am bold enough to make a proposal which, I believe, will have your approval—that we should send him the following telegram:—"To Adolf von Baeyer, München. Chemists of all nations gathered in

London to honour Perkin, keenly regretting your absence, send you hearty greetings, and wish you long life and powers still further to enrich science by your discoveries.—MELDOLA, Chairman.” (Cheers.)

(To this the following reply was received later :—

“Heartily congratulating Perkin jubilee, I send best thanks for your kind telegram.—BAEYER.”)

Without further words, I give you the toast of “Our Visitors,” coupled with the names of Professor Emil Fischer, Professor Haller, and Lord Alverstone. (Cheers.)

GEHEIMRATH PROFESSOR DR. EMIL FISCHER, in reply, said :—

My Lords and Gentlemen,

As I am not able in replying to the kind words of Sir Henry Roscoe to exactly express my feelings in English, I must beg your permission to use my mother tongue. Als vor einem halben Jahre von den englischen Chemikern der Beschluss gefasst wurde, die heutige Jubelfeier zu veranstalten da fand der Gedanke auch ausserhalb Englands allenthalben freudige Zustimmung. Wenn es gilt einen hervorragenden Fachgenossen zu ehren so sind bekanntlich die Chemiker aller Nationen leicht zur Teilnahme zu gewinnen, denn bei uns besteht glücklicherweise ein starkes Gefühl der Solidarität, das durch die Grenzen der Länder und Continente nicht beschränkt wird.

Wir haben nicht allein in unserem Berufe die gleichen Freuden und Leiden, sondern wir sind uns auch bewusst, demselben grossen Ziele zu zustreben, die Materie im weitesten Umfang des Wortes der Herrschaft des menschlichen Geistes zu unterwerfen.

Wenn wir auf dem Wege dahin mit einander in Wettbewerb treten, so geschieht es in neidloser Anerkennung jeder wirklichen Leistung und das gilt nicht allein dort, wo es sich nur um die wissenschaftliche Ehre handelt, sondern selbst auf den Gebieten, wo die klingenden Werte industrieller Production im Spiele sind. Mir scheint dass diese gute Gewohnheit der Chemiker in Zusammenhang steht mit dem innersten Wesen unserer Wissenschaft, die einen ausgesprochen socialen Zug hat, die man die Sociologie der Elemente nennen könnte und die in der Herstellung von Verbindungen jeglicher Art bekanntlich die grösste Fertigkeit hat. Dass die gleiche Fähigkeit auch ihren Jüngeren nicht fehlt, beweist die grosse Zahl der chemischen Gesellschaften und Vereine, die bei dieser Feier vertreten sind und denen die Chemical Society of London als älteste vielfach zum Vorbild gedient hat.

Allerdings hat erst die moderne Chemie diese verbindliche Form collegialen Denkens und Fühlens angenommen. In früheren Jahrhunderten, wo sie nur eine einfache Scheidekunst war, stand sie vielmehr in Verdacht, nicht allein die Materie zu zersetzen, sondern auch die Menschen zu entzweien und sogar die Völker durch Erfindung von Schiesspulver und ähnlichen Dingen zum Kampfe anzuregen. Im Zeitalter der Synthese ist das aber anders geworden, denn heutzutage scheiden wir nur noch, um wieder zu neuen und höheren Einheiten aufzubauen und schon lange ist für die Chemie die friedliche Arbeit, mit der sie alle Zweige des wirtschaftlichen Lebens befruchtet, in den Vordergrund getreten.

Allerdings glauben in neuester Zeit ängstliche Leute bei ihr wieder einen kleinen Rückfall in die alte Gewohnheit der Analyse und Zerstörung zu beobachten und diese Bewegung geht aus von den englischen Collegen. Verdächtig war schon die Entdeckung der neuen Gase in der Atmosphäre durch Lord Raleigh und Sir William Ramsay. Denn sie sind durchaus unsociale Wesen, die jede Verbindung vermeiden und als einatomige Elemente ein einsiedlerisches Dasein führen. Aber weit schlimmer erscheinen die neuen Bemühungen meines Freundes Ramsay und seiner radioactiven Gesinnungsgenossen in Frankreich und Nord Amerika sogar unsere letzten Einheiten, die Atome, zu zertrümmern, während gleichzeitig die englischen Physikern mit Sir William Crookes an der Spitze, sich ein Vergnügen daraus machen, die Welt mit Elektronen und anderer “radiant matter” zu bombardieren.

Das sieht allerdings sehr kriegerisch aus, aber wenn sie es zu arg treiben und unsere Ruhe stören, so brauchen wir uns nur an Sir James Dewar zu wenden, der sie durch Abkühlung, wenn nötig bis zum absoluten Nullpunkt, schon zur Vernunft bringen wird. Zudem dürfen wir hoffen nach dem, was ich heute bei Sir William Ramsay gesehen und gehört habe, dass die Zertrümmerung auch bei den Atomen nur eine vorübergehende Phase ist, nach dem Prinzip der umkehrbaren Reaktion bald ein Wiederaufbau von neuen und schöneren Elementen folgen wird.

Wenn dieses Ziel erst in vollem Umfang erreicht ist und wenn gleichzeitig die organische Chemie, natürlich unter reger Beteiligung der Familie Perkin und anderer trefflicher Chemiker dieses Landes, aus den alten und den neuen synthetischen Elementen alles das, was die lebende Welt nötig hat, viel mannigfaltiger, schöner und besser bereitet, als es der Natur jemals möglich war, dann wird unsere Wissenschaft auf der Höhe ihrer Aufgaben angelangt sein; dann wird sie kräftig dazu beitragen, späteren Geschlechtern das goldene Zeitalter zu bescheeeren, wo nur noch Glück und Freude auf unserem Planeten existirt.

Einen kleinen Vorgeschmack von diesem seligen Zustand haben wir schon heute bei diesem herrlichen Feste, dessen harmonischer Verlauf allen Teilnehmern eine liebe und heitere Erinnerung sein wird. Dafür schulden wir aufrichtigen Dank nicht allein Sir William Perkin, der die Gelegenheit dazu gab, obschon er vor 50 Jahren kaum daran gedacht haben wird, sondern auch den Herren vom Fest-Komite, welche die Gelegenheit so geschickt und glänzend ausgenutzt haben.

Im besonders hohen Grade aber fühlen wir "visitors" diese Verpflichtung, weil wir gleichzeitig die altherühmte englische Gastfreundschaft in vollen Zügen genießen. Unser Dank dafür gilt der Gesamtheit der englischen Fachgenossen, und um ihn in ein passendes Gewand zu kleiden, will ich der Chemical Society of London, unter deren Schutze wir hier weilen, den alten akademischen Glückwunsch zurufen:

Vivat, floreat, crescat!

PROFESSOR A. HALLER.—Monsieur le Président, Sir Henry Roscoe, Messieurs,—Toutes les fois que les événements nous conduisent à passer le détroit qui nous sépare, nous sommes particulièrement touchés de la franche et cordiale bonhomie avec laquelle vous nous accueillez et nous offrez l'hospitalité. Nous vous en sommes profondément reconnaissants.

La manifestation grandiose à laquelle nous avons pris part au début de cette journée, celle à laquelle nous assistons à l'heure présente, sont parmi les plus réconfortantes qu'un homme de science et d'action puisse rêver. Nous sommes unis, sans distinction de nationalité ni de parti, dans un même sentiment de vénération, pour fêter le savant qui, à l'aurore de sa belle carrière scientifique, a eu la bonne fortune d'être un initiateur, un pionnier de la première heure d'une des branches, sans aucun doute les plus fécondes, de la science et de l'industrie organiques.

Quand, dans un de ces moments de recueillement, où l'esprit se plaît à faire un retour en arrière, Sir W. Perkin se laisse aller à évoquer les étapes successives qu'a parcourues l'industrie dont il a jeté les bases, il a le droit d'être fier de la brillante carrière qui lui a été réservée.

Il s'est trouvé des hommes de science qui ont observé, comme lui, que certains principes extraits du goudron sont susceptibles de fournir des colorants, quand on les traite par divers réactifs. Runge était de ce nombre, et, si nous en croyons quelques-uns de ses anciens disciples, Gerhardt, au cours de ses multiples essais, a également rencontré maintes de ces matières, notamment le rouge fuchsine; mais, systématiquement dédaigneux de toute réaction colorée et n'en entrevoyant pas les conséquences pratiques, il ne poussait pas plus loin ses investigations et passait outre. Aussi, ce qui ajoute à l'originalité de la découverte

de Sir W. Perkin, c'est d'en avoir pressenti l'intérêt industriel et d'en avoir poursuivi la réalisation dans l'usine.

En cela il a été un novateur de génie. Toute nouvelle et toute importante qu'elle fut pour l'industrie de l'époque, son invention a eu cependant un mérite d'une portée beaucoup plus haute. Elle a en effet été l'étincelle jaillissante qui a suscité et entretenu depuis cinquante ans l'ardeur et la sagacité de légions de chercheurs, analysant, retournant et fouillant sans cesse, et dans tous les sens, ce vaste champ d'études, le goudron de houille, signalé par lui à leur attention.

Sur cette terre d'initiative et de libre concurrence, Sir W. Perkin a eu d'abord des émules nationaux qui ont fait une riche moisson de couleurs de toutes sortes, dont ils ont doté l'industrie.

À la même époque, la France rivalisa avec l'Angleterre, et nombreux sont les colorants, à ton et à éclat variés, dont nos chimistes et nos fabricants ont enrichi la palette du teinturier et de l'imprimeur.

Sous l'impulsion vigoureuse et éclairée de Hofmann, l'Allemagne ne tarda pas à entrer, à son tour, en lice. Imprégné de votre esprit entreprenant puisé à sa source même, Hofmann, second Liebig, sut discerner, avec une rare pénétration et une justesse de vue remarquable, le rôle efficace, prépondérant, que pouvait prendre désormais la science mise au service de la nouvelle industrie. C'est sans aucun doute à l'action judicieuse et constante de Hofmann et de son école, que l'Industrie des Colorants est arrivée à son épanouissement actuel en Allemagne.

Brillante et distinguée est la phalange des hommes de science de toute nationalité qui ont contribué au progrès de cette branche de l'activité humaine. Mais, si Sir W. Perkin en est le promoteur et aussi le Doyen, nous ne saurions oublier, et c'est là ce qui lui fait le plus d'honneur, que tout en tirant de sa première découverte tout le parti qu'il pouvait en tirer pour l'époque, il n'a pas perdu le chemin du laboratoire, il est resté fidèle au travail de recherches et a pendant une longue suite d'années abordé, avec un égal succès, les sujets les plus divers. Le nom de Perkin n'évoque pas seulement l'idée de la mauvéine, mais il est attaché aux synthèses et aux réactions les plus ingénieuses. Il s'est même fait une place marquante dans le domaine de la chimie physique. La magistrale et consciencieuse étude sur les pouvoirs rotatoires magnétiques des composés organiques, n'est-elle pas un chapitre nouveau et suggestif introduit dans ce domaine ? À ces multiples mérites qui suffiraient à eux seuls pour sauver son nom de l'oubli, il lui a été donné de pouvoir ajouter un autre, non moins apprécié. Grâce aux dons précieux qu'il leur a transmis, grâce aussi aux nobles et judicieux exemples de labeur soutenu qu'il leur a donnés, il a pu, avec quels brillants succès déjà, assurer la continuité de son œuvre dans la personne de ceux qui le touchent de plus près et qui lui sont les plus chers. L'auréole qui entoure son nom n'est pas près de s'éteindre. Elle est destinée à briller d'un éclat sans cesse renouvelé. Je fais des vœux pour que, pendant de longues années encore Sir W. H. Perkin puisse contribuer personnellement à illuminer de ses conceptions et de ses travaux la science et l'industrie de son pays. Je termine, Messieurs, en vous demandant la permission de boire à l'alliance féconde et prospère de la science et de l'industrie de la Grande Bretagne, dans ses représentants les plus illustres et les plus vaillants. (Cheers.)

LORD ALVERSTONE (Lord Chief Justice).—Mr. President, my Lords and Gentlemen,—At this late hour, and after the interesting speeches we have heard in response to this toast from Professor Fischer and Professor Haller, I can only permit myself to detain you for a very few moments. On the other hand, I am proud to be allowed to speak on behalf of those men of my own country who have been invited to take part as visitors in this

great celebration. I have, unfortunately, no claim to respond either as a visitor or in any other capacity—I have no original or acquired chemical knowledge. I have stood outside the walls of the temple on many occasions, and the high priests have come out and anointed me temporarily, and have infused into me a little superficial knowledge. I have made it go as far as I possibly could (laughter), and I was very thankful if I was not found out. I am bound to say that when I used to have the honour of arguing, as I frequently did, before my great friend Lord Halsbury, I generally was found out. (Laughter.) He had chemical knowledge; I had only crammed chemical knowledge. My lords and gentlemen, I have some slight hereditary right to take part in these proceedings, for my father before me was connected, comparatively, with the very beginning of the coal-tar discoveries, and during 30 years of an active professional life I had the privilege of being associated with many chemists and scientific gentlemen who are round this table. On behalf of the English guests and visitors, I do wish most earnestly to express our satisfaction that, as my friend Mr. Haldane has said, though late, yet not too late, the honour has come to Sir William Perkin which might, perhaps, have been bestowed upon him long ago. (Cheers.) At the same time, if that be an instance of what Mr. Haldane calls muddling, I am thankful to think the muddling has come out right in the end, and that Sir William Perkin will always be able to look back to this great gathering as a tribute to his reputation. (Cheers.) The esteem and honour in which he is held is evidenced, not only by the messages which he has received from all parts of the world, but also by that interesting gathering which took place in the Royal Institution to-day, and which the necessity of paying some attention to my duties prevented me from being present at. There is only one other observation I shall venture to make, and which has occurred to me in consequence of the speeches which have been delivered to-night. I do not for a moment deny there is a great deal in the arguments of my right hon. friend Mr. Haldane, with reference to the different position in which scientific research and education stand in Great Britain, or in the British Empire, as compared with that in which they stand in some other nations. On the other hand, I venture to think that perhaps the result is more robust, and sometimes even more successful, because it proceeds from the innate genius of those who are working at science in Great Britain, and is not fostered, or scarcely fostered at all, by any aid from the State. On the other hand, I wish to observe that we here in Great Britain are able to point to some things which show that, as a nation, we have for many years, for many generations, recognized the credit that ought to be paid, and the protection that ought to be given, to scientific discovery. (Hear, hear.) There is a striking instance of that, with which many of you are acquainted, that made a great impression upon me when I heard it from the lips of a great man who has passed away. I refer to the fact that Sir William Siemens, that distinguished German chemist and inventor, came to Great Britain, and became a British subject, solely in consequence of the protection afforded by the law of England at that time to scientific discovery and research. (Cheers.) And although it may be perfectly true that from the action of circumstances, some beyond our control, but others, perhaps, which we might have controlled, some of these industries have found a wider scope and greater opportunities in foreign lands, still I desire to say, on behalf of my country, that not only on this occasion but on every other occasion, as has been truly said to-night, we recognize the right and property of foreigners who have themselves made great discoveries and inventions, and, in this country, at least, there is no jealousy in the matter of science. (Cheers.) We are glad to recognize the right that foreigners have, and are glad to know that they can come to our shores and remain here, because it has been a part of the law of Great Britain, a part of

our practice, to recognize property in invention and to protect a man's brains. (Cheers.) I have detained you longer than I intended, but, at the same time, I felt, speaking before such a distinguished body of guests, that it was my duty to say a few words in supplement of what had been said by the distinguished scientists; and, on behalf of your English guests, I repeat our great appreciation of the compliment paid us in asking us to take part in this commemoration, which we shall never forget, and in permitting us to add our tribute by our presence to the great man whom we have assembled to celebrate to-night. (Cheers.)

The CHAIRMAN,—Your Highness, my Lords and Gentlemen,—I feel at this late hour that the toast which has been committed to my care can hardly be done justice to. In the first place, the theme itself is a large one, and, in the next place, the subject of the Coal-Tar industry, which I have been asked to propose, has had so much said about it, and so much written about it, that it seems to me there is little left to be said that is not already familiar to the public at large. Nevertheless, such a gathering as this is so memorable—it may become historical—that it is important before we part that this toast should be submitted, and by virtue of my accidental position as President of the Chemical Society (“No, no”) the honourable task has fallen upon me of being Chairman of the executive committee carrying out the arrangements for doing honour to our distinguished guest of the evening, and of presiding on the present occasion. (Cheers.) Having also myself, to some extent, been connected with the Coal-Tar colour industry it is not, perhaps, altogether inappropriate that this toast should have been placed in my hands. At a late hour it is a toast which is surrounded with the greatest difficulties. Coal Tar is not a subject which lends itself readily to that hilarity which our visitors expect to be associated with an after-dinner speech. I believe that the one great joke which centres around the Coal-Tar industry has been so frequently repeated that it can no longer claim to be a joke, but it may be well to repeat once again that Sir William Perkin did not discover the Coal-Tar Colours by observing the iridescent film on tar distributing itself over the surface of a pool of water. (Laughter.) The Press will kindly take notice of that, because I believe that is one of the standing jokes which have been handed down from generation to generation with respect to the origin of the Coal-Tar industry. Then, again, there is the difficulty of how one can propose the toast of an industry. One can propose the health of a person or a cause, but an industry is a difficult subject to associate with a toast. However, it is perfectly obvious that the health of the Coal-Tar industry requires no external stimulation on our part, for from what we heard this morning, and from the very distinguished gathering around us, it is perfectly evident that the Coal-Tar Colour industry is in a flourishing state. (Hear, hear.) However, there are many misapprehensions which it may be well to take the present opportunity for removing, or at least a few of them. There is no subject, I presume, which has been so much a matter for misapprehension on the part of the public as the Coal-Tar Colour industry. It has had to pass through the phase of actual prejudice. I remember even, in my younger days, the term aniline dye was a term of reproach. A Coal-Tar dye was looked upon as gaudy, fugitive, and having every objectionable quality. The public do not recognize what a miserable colourless world this would be at present without Coal-Tar colouring matters. (Cheers.) There is not a garment we put on, any of us, either male or female, that is not at some stage or other indebted to the products of the tar still. Then, again, the toast is one that commends itself to us by virtue of the intrinsic importance of the subject as a subject, for not only has it its important industrial side, but, above all, its enormous and direct influence upon the development of chemical science can never be over-estimated. (Cheers.) All chemists present will realize the very great advantage which has been conferred upon their science from the beginning of this industry by the command of materials hitherto rare, costly,

and difficult to obtain, but which the introduction of this industry has enabled them to procure on a colossal scale without difficulty, and so their science has made enormous strides. Then there is another point which has seemed to me of great importance in this country. It has been referred to by our right hon. friend, Mr. Haldane. It is an obvious fact from this gathering that the home of the Coal-Tar Colour industry at the present time is in Germany. Whatever we may say with regard to the causes, that is a fact which we must in all fairness admit. I will not venture to go into the question of the causes at this late hour, but it has been truly said that science is cosmopolitan; and, as a man of science, I feel, and always have felt, and have never hesitated to express the opinion, that as an achievement in the domain of applied science, the progress which Germany has made is one that stands out for the admiration of the whole civilized world (cheers), and I am very glad of this opportunity of congratulating our German colleagues upon their success. (Hear, hear.) It may be a matter of regret for us that we have not made the same progress that they have, but they have made it by perfectly legitimate methods, and I say that we should not hesitate to congratulate them on this occasion on their success. (Cheers.) It is frequently said that Germany has robbed us of something in taking this industry, but does not that convey with it the principle which has always seemed to me inadmissible, that because a certain discovery is made in a particular country it must for all time remain in that country? Is there to be no competition throughout the world? (Hear, hear.) Had our manufacturers adopted the same methods that the Germans have adopted we might have been in a different position to-day from that which we actually are at the present time with reference to this industry. There is another misapprehension which I think might perhaps be referred to on the present occasion. It is said very often in the papers that we have lost the Coal-Tar Colour industry. That is not the case at all. There are many Coal-Tar colour factories in England, and I am glad to welcome amongst us their representatives at this table. Representatives of all the Coal-Tar colour factories are at this board. I was for a great many years, associated with this industry, and I have no hesitation in saying that we in England at the present time are actually making more Coal-Tar-colouring matters than we ever were. (Cheers.) The actual output of dyestuffs from our Coal-Tar colour works is greater than ever, but what has happened is this—that while we have been progressing at a certain rate, Germany has been progressing at such a much greater rate that her output overshadows ours to an extent that has given rise to this erroneous idea that we have lost the industry altogether. My Lords and Gentlemen,—I take the present opportunity of asking you to allow me to correct this misapprehension. (Cheers.) We have not lost the industry, but we have not progressed to the same extent as our German colleagues. Moreover, the centre of activity of this industry has shifted. In my younger days we looked to France, and the names of Girard and De Laire, Lauth, Coupier, Poirrier, and Rosenstiehl were in all our mouths. I remember that, at the French Exhibition of 1877, the French exhibit was one of the finest of Coal-Tar colouring matters in the whole exhibition, and we also made a good show at that time. Things have changed since then. This is not the moment for going into the question of the cause, but as regards the actual facts they are as I state. We have progressed slowly, but Germany has progressed by leaps and bounds. In asking you, therefore, to drink to the prosperity of the Coal-Tar Colour industry, I may, perhaps, be permitted to divide this toast into three portions. It is not the Coal-Tar Colour industry alone that we are concerned with. The obtaining of chemical products from Coal-Tar for the purpose of producing colouring matters has led to developments in many other directions. It is no longer the Coal-Tar Colour industry only, and you will notice that we have left out the word “colour” in our toast list, for out of this industry, with the materials placed

at the disposal of modern chemistry, there has arisen the manufacture of large numbers of other products of value to humanity which are distinctly not colouring matters. (Cheers.) The industry has catered for the arts of peace as well as for the arts of war. There are obtained from the Coal-Tar products not only dyestuffs, but perfumes, flavouring matters, and, in the presence of the Minister for War, I may add explosives also. (Laughter.) All this many-sided industry has sprung from the first discovery of Sir William Perkin half a century ago. (Cheers.) Therefore, in asking those who are to respond to this toast to deal with the subject under three heads, I may remind you that we have to deal, in the first place, with the chemical products—dyestuffs, perfumes, explosives, photographic materials, and the various products obtained from tar. Then we have the application of dyestuffs. It is, perhaps, another of the fallacies which may pervade the public mind that sheep come into the world born with their wool already dyed different colours (laughter), but that is not the case. They are entirely dependent upon chemical skill. Then, again, even the silkworm has but a limited number of pigments at its disposal. We are entirely dependent upon the tinctorial skill of the dyer to apply the dyestuffs, and we have among us to-night a veteran in the person of Sir Robert Pullar, who was one of the first to test Sir William Perkin's new dyestuff and encourage him in its manufacture. Therefore, from the tinctorial point of view, this toast can be associated with no more interesting name than his. (Cheers.) And then there is another development which is, from the humanitarian side, perhaps the most important of all. I refer to the use of the Coal-Tar colouring matters for biological purposes. (Hear, hear.) Perhaps it is not fully recognized what a great debt of gratitude is due to this discovery on the part of biologists. The germs of disease have been revealed by the application of these artificial colouring matters; and then, again, the introduction and the use of the organic chemicals made possible by this industry has resulted, further, in the artificial production of various medicinal preparations the value of which I am incompetent to speak about, but it is well that this side of the industry should not be lost sight of. We have amongst us Sir William Broadbent, whom I am glad to be allowed to associate with this side of the toast. (Cheers.) Before I conclude my remarks—and I ought to have said that I am going to ask Dr. Duisberg to reply on behalf of the chemical side of the industry (hear, hear)—I should like again to say that, far from our having a grudge against Germany for her great advancement in this industry, our guest of to-night is a German product, for he was a pupil of Hofmann (laughter and cheers), who was himself the prime promoter of the Coal-Tar Colour industry in Great Britain for many years. (Cheers.) There is one other point. We have a large and flourishing tinctorial industry—one of great importance to this country—and I say that that industry has thrived and grown upon German discovery. It is not going too far to say that the tinctorial industry has been developed enormously and owes very much to the discoveries made by German chemists. (Cheers.) And perhaps I may be allowed to add in conclusion, not only is that so, but even our Coal-Tar manufacturers themselves are deriving advantage from German discoveries, because whatever may be said about the imperfection of our patent laws—and that is a knotty point I do not propose to discuss—a patent does not last for ever, and when a patent lapses the product is open for manufacture by the world, and to my knowledge there are many German discoveries being worked here to the benefit of this country. They are being worked quite legitimately, let me state, in case any misapprehension should arise on that point. I refer to colouring matters of which the patents have lapsed, and which are now being manufactured in this country—colouring matters of German origin. Therefore the progress of Germany, my lords and gentlemen, has not been adverse to this country; it has helped us considerably, and it will

help us in the future. (Hear, hear.) I ask you to drink to the prosperity of "The Coal Tar Industry," and I couple with the toast, on the chemical side, the name of Dr. Duisberg. We have among us Dr. Caro (cheers), whose modesty alone prevents him from replying. On the tinctorial side I couple with the toast the name of Sir Robert Pullar, and Sir William Broadbent will be good enough to respond for the toast as regards the medical application of the industry. (Cheers.)

PROFESSOR DR. CARL DUISBERG said: Mr. President, your Highness, my Lords, and Gentlemen,—I have to apologize for speaking in German, having been rather suddenly asked to respond for this toast. (Several voices.—"No, no, English.") Proceeding with his speech in German, he said:—

[Translation.]

This morning, during the dignified celebration in the Royal Institution, when standing before the small, but so historically valuable, sample of benzene, which Faraday first isolated there, a rare sensation overcame me—before my mind's eye this small glass expanded to an enormous vessel filled with millions and millions of gallons of this product. I saw all those gigantic factories in which benzene is employed and applied to manifold wonderful purposes, and also pictured to myself the Coal-Tar industry which came into existence here half a century ago. There appeared to me the countless numbers of products distilled from coal-tar and the thousands and thousands of coal-tar colours in all the various shades and tones of the rainbow, commencing with mauve and magenta, passing on to artificial alizarin through the large series of rosanilines and azo-colours to the king of all artificial dyes, the synthetical indigo. Not alone these, but also the pharmaceutical industry, with the numerous pharmacological curatives, stood out distinctly before my mind; in the first place, carbolic acid, which was formerly produced from coal-tar, but also now synthetically from benzene, next came kairin and antipyrine, antifebrin and phenacetin, the numerous other antipyretics and antineuralgics, the astringents and the hypnotics and to crown these all the serum products. The sense of smell was gratified by, the delicious perfume of the artificial scents, the first of which, coumarin, the scent of new-mown hay and sweet wood-ruff, was produced by Perkin synthetically, the artificial vanillin, the substitutes of oil of roses, and last not least, the sweet smell of the violet and vine-blossom, ionon.

The photographic and photochemical products, though small in number, are none the less important in their scientific position, although technically they are mere dwarfs in comparison with the giants and valiant knights of the artificial dyestuffs.

In the midst of this vision there stood out in actuality the man in mental and physical vigour who had founded all this, by discovering the first aniline dyestuff mauve, who technically produced the first aniline colour, who has lived through and who has assisted to develop the progress made.

Here on English soil, where the gas and tar industry started, where benzene, naphthalene, and anthracene were first obtained in large quantities, is the cradle of this industry, here this industry began its existence. It did not, however, make its home solely on these shores, but, like a bird of passage, as soon as it could use its wings, peregrinated through France and Switzerland to finally settle on German ground.

It is only natural that, on the fiftieth anniversary of the foundation of the Coal-Tar Industry, the question should be raised, why did not the Coal-Tar Colour industry obtain a secure and permanent footing in the land of its birth, and why has it reached such perfection and development in Germany? Much has been said and written on this point in this country. Professor Meldola also included this subject in his toast. (He did not solve the problem, but left it to me, as representative of the German Coal-Tar Colour industry, to find the solution. I could easily free myself from this task

and say the reasons are well known to me but are part of the secrets of my firm, and that my contract with the Elberfeld Farbenfabriken does not permit my mentioning them. I shall, however, not resort hereto, but shall endeavour to make clear to you the real reasons for this peculiar industrial dislocation.

That it is not due to capital is clear from the fact that England, the wealthiest country in the world, was unable to retain this industry, but that it settled just in Germany, which 30 years ago could properly be termed a poor country. That it is not due to any patent law system or the system existing in Germany of compulsory manufacture, as is often supposed, can be easily proved. As regards patent law, England has been typical for all other countries, and England was the first amongst all nations to possess patent rights. Although England has no law for compulsory execution of patented processes, this has not in any way proved detrimental to her industries, for facts prove that the respective conditions of the German law have hitherto not been of the slightest assistance to the industry of that country. We representatives of the German chemical industry are doing all we can to revoke such stipulations of our patent law. Even if England took retrogressive steps and passed a law revising the patent laws in this respect, it would be of no avail for the Coal-Tar Colour industry of this country. One of the largest colour manufactories in England had about ten years ago the licence for exploiting all the English patents of two of the largest German colour works, which at that time represented the value of many millions of marks; it did, however, in no way avail itself of this advantage, although the English firm had no restrictions and were no worse off than the German ones, as they merely had to pay for this licence a very small portion of their net profit to the patentees for the working of the respective patents.

Protected duties have also not assisted the Coal-Tar Colour industry in Germany, for we have neither had them in the past nor do we wish for them, nor is there any need for them. The Minister for War has just told us that if A. W. Hofmann had stayed in England that industry, which was under his protection and which he had assisted to build up in England, would probably never have gone to Germany. I believe that this is also an erroneous opinion. Even had Hofmann stayed in England, the Coal-Tar Colour industry would have found a firm footing in Germany, and have attained great importance, as most of the discoveries have not resulted from Hofmann's principles, but, as we heard this morning, from Adolf von Baeyer's school, such as synthetical alizarin, indigo, &c., &c. The cause of this peculiar development of the German Coal-Tar Colour industry is not to be sought in artificial, but in natural circumstances; not in the conditions of the law, but in the legitimate conditions. Like man himself, like peoples and nations, industries in their development and propagation are subservient to the maxim of our great logician and poet Goethe, "*Nach ewigen und ehernen grossen Gesetzen müssen wir alle unseres Daseins Kreise vollenden*"—that is, "*According to eternal and stern laws we must all complete our sphere of existence.*"

And if you ask in what does this conformity to law consist, you have merely to remember your own countryman Charles Darwin, who has taught us that all organic beings, under whatever conditions and in whatever climes, can exist, but that they grow most powerful and mighty in the struggle of life where the natural conditions, the nature of the ground and climate, are the most favourable for their perpetuation.

This also applies to the Coal-Tar Colour industry, founded in England.

This distinctive branch of industry, the Colour industry, has indeed considerably developed on English soil and borne good fruit. As Prof. Meldola mentioned, it has not in any way diminished, but is greater now than it ever was. After its time of blossoming, its seeds were wafted to France, to Switzerland, and, above all, to Germany, or, perhaps, carried there by birds. On every ground where the seed fell or where it was sown it took root, and for its requisite conditions of

development Germany was the best suited. Here this new plant shot forth its stems, bore abundant blossoms, and ponderous ears; and developed to a great and mighty colony. The natural conditions there were particularly favourable for its development. This is, and must remain, the solution of the problem. But your curiosity is apparently not satisfied with this solution. You inquire further and wish to know how it is that the German soil, in which the Coal-Tar Colour industry has grown so powerful, varies from the English soil; what particular conditions were there which had been so advantageous for its fructification; whether it was not eventually possible to produce artificially the same conditions also in England, whether also here the soil could not be improved and cultivated, and that here also in the land of its birth those rich and golden fruits could not be gathered, the harvest of which is reaped by Germany year by year.

I will also reply to this query and give you my candid opinion based on such experiments which we ourselves have made; I myself do not believe in such an acclimatization in England, at least not for the present.

The English nation is distinguished amongst all other nations by its sense of the practical, and this is its admitted feature. We Germans were in the past stigmatized as logicians and theorists. Since the great and severe struggles which we had to go through, since the confederation of the German nations, we Germans have awakened from this lethargy. We have also learned to be practical, but, of course, not at the expense of our ideals.

No other industry requires so much uniformity of thought and action, science and practice, as organic chemistry and the organic-chemical industry. In Germany not only has chemical science developed to a considerable extent, but at the same time the technique of organic chemistry has flourished. Both have stimulated and vitalized each other, and both have supported each other. Such was not the case in England; both were not to be found together in the same degree, or but seldom, as in the case, for instance, of Perkin. There is another point not to be overlooked. Although the Englishman is in general practical, he is wanting in that particular quality which we Germans are remarkable for—*i.e.*, not perseverance, but patience and the power of waiting for success. For all that the Englishman does he expects soon to be compensated in hard cash. In no field of technical work must one toil with such patience, and even with the eventual relinquishment of material recuperation, as in the Coal-Tar Colour industry. It does not suffice merely to plough and dig up the soil in the most ardent manner, it does not suffice to impart to it mental and intellectual manure of all kinds—*i.e.*, nitrogen in the shape of skilled technical chemists, and phosphorus in the form of distinguished inventors and scientific chemists, for both of these are purchasable and have often been tried; but it requires, above all, a singular ability to wait and bide things coming combined with endless patience and trouble till the ground is finally mature and capable of developing new kinds and species. We Germans possess in a special degree this quality of working and waiting at the same time, and of taking pleasure in scientific results without technical success. I will prove this to you by a practical example, which even in its very name will perhaps not arouse pleasure but sadness in your English hearts, but in which the consequences have not been so serious as is generally supposed in England. I refer to indigo, which formerly was extracted exclusively from the indigo plant, but now obtained, for the most part, synthetically from coal-tar. To ease your minds on this point, I would remark that the surface ground necessary to produce the total quantity of indigo in India is actually not larger than the relatively small Duchy of Baden. Adolf von Baeyer 22 years ago taught us that indigo could be produced synthetically, but despite this well-known fact it took more than 15 years of continual labour and intense practical and mental work, costing enormous sums of money, to solve the problem and produce it cheaper than nature herself. All nations were free to take a part in this

work. We Germans were the first to reach the goal, but even in Germany it is only to one firm, our friends the Badische Anilin und Soda Fabrik, that the laurels of technical success are to be awarded.

But you will say, when the problems have been solved, and when the patents have run out, and the manufacture is free to every one, why should not the English and foreign works decide to cope with the German firms and compete against them? In my opinion this also would be futile and would be of no avail. Even in Germany, where as we have seen, the conditions are the most favourable, it would now be scarcely possible, or at least be a singular coincidence, if a manufacturer, although possessed of energy and capital, should succeed in building up a new firm in the colour line so as to successfully compete against the existing powerful works. And this applies even more to other countries. Trials have often been made. Although in the first instance France and then Russia had set up strong barriers in the form of patent laws and high protective duties they have succeeded only in so far that a small series of colours and products for their home consumption are manufactured in these countries from intermediate products made in Germany. But all such products have become very expensive to the home consumer, for the manufacturers are not Frenchmen or Russians respectively, but branches of the larger German colour works.

Whereas, therefore, the conditions in England for many industries, such as for the mining industry, for spinning and weaving, not forgetting inorganic chemistry, are far more advantageous than in Germany, the latter country has the natural privilege in the organic-chemical industry, and other nations should not envy her in this, but leave it to her.

On my way to London yesterday I was casually perusing a little book, "Americana." Therein one of our distinguished historians, Carl Lamprecht, of Leipzig, described in aphoristic form the results of his observations during a long journey in America. In comparing the industry of America with that of other countries, he says in one place, "What ails thee, happy Albion, if thou didst not imagine that something ails thee?"

This sentence I retained in my mind, and I recollected it again when I was called upon to speak on the German Coal-Tar Colour industry. In the same view as Lamprecht, I would like to point out that England has really no cause for complaint about her success and position in the world, and especially no reason for complaint that perhaps one or another country has superseded her in one or other industry. England has a highly-developed coal and iron industry; her textile industry, both spinning and weaving, is second to none. She has more colonial possessions subservient to her than any other country in the world, and only in the coal-tar colour industry, on account of the natural conditions, must she be satisfied with second place. Why should Germany in this one instance not take a leading position? We manufacture sufficient quantities of all organic chemical products to supply the whole world. We also put them on the market at such prices that in England it is not possible to manufacture them.

We have particular pleasure in delivering them to the extremely developed English refining industry, to the dyers and printers, who, together with the textile industry here, have made greater strides in progress than any other country. Therefore, do not deny Germany this her position, and rest assured that really in that country the conditions are in every respect more favourable than in England.

That the cradle of the Coal-Tar Colour industry was in England has its great advantage, which I would like to particularly lay stress upon to-day, and is the purport of my toast. If mauve had not been discovered 50 years ago here, if we had not found in Perkin a man in whom both scientific and technical qualities were combined, and had this industry not peregrinated we should not have had this opportunity of celebrating this jubilee *internationally*.

We Germans, therefore, availed ourselves of this favourable opportunity of coming to London to express to you all here, as we have already done this morning, our heartiest congratulations on this singular and memorable event. The present occasion offers us also a favourable opportunity of smoothing over any political misunderstandings which are so detrimental to both nations, and of fraternizing with our neighbours on this side of the Channel.

We sincerely wish the English chemical industry and especially the organic chemical industry prosperity and success. The present numerous representatives of the German chemical industry hold out with great pleasure their willing and honest hand to their *confrères* on this side of the Channel in the hope that no enmity will ever sever us, but that in our own interests and for the welfare of the world at large, peace and friendship may ever reign between us.

Let us therefore, worthy representatives, rise and in proper German manner fill our glasses to the brim, and with one voice and accord let our sincere wish be

"Prosperity to the chemical industry of England," Hurrah, Hurrah, Hurrah ! (Loud cheers and cries of "Hoch" from the German visitors.)

SIR ROBERT PULLAR, LL.D. :—I was asked by the President to prepare a few remarks on the application of colours, but at this late hour I am sure that you will not be willing to listen to anything on that subject. (Cries of "Go on.") I suppose that I am one of the oldest here in the dyeing line, because I have been for 60 years a practical dyer, and therefore I consider I have some claim to speak about the great change which has come about in dyeing. I had the honour and pleasure of seeing the first specimen of the new dye that was ever produced on silk. It was sent to me, and I was asked what I thought about it, and I wrote back in reply, "If it is possible to apply that in a practical way, it should be a very valuable thing." Any one who knows anything about silk dyeing is aware that, prior to this invention purple dyes were so fugitive that sometimes a lady would have a new violet ribbon in her hat in the morning and by evening it would be a sort of red colour. That is the kind of thing Sir William Perkin and I tried to overcome at the works at Perth for a considerable time before he took out a patent. I, as a young man at the time, felt from the very first that this purple was a valuable thing, and as I was unable to help it forward myself, I introduced Sir William to a friend, Mr. Keith, in Bethnal-green, the largest silk dyer in London at that time, and he encouraged him to proceed with his discovery, and was as enthusiastic about it as Sir William himself. He believed in it from the first, and, as we all now know, the results have been so astounding that it would take a whole evening to speak about them. There has been a total change from the old system which I was brought up under, with all the long processes that were necessary. These have been all done away with, and now we get results of a most marvellous kind with every description of material. It is really beyond the dreams of almost any one to think what a complete revolution that Perkin discovery made. (Cheers.) It effected a revolution in the tinctorial arts, and it also brought about a revolution in the researches of chemists. Formerly large numbers of what were known as waste products were thrown away, but owing to the study of these products we now not only have colours, but in many other ways enormous progress has been made, just confirming what the famous Faraday very wisely said, "Without experiment I am nothing. Still try, for who knows what is possible." (Cheers.) I am sure that has been the case in this. Had there been time to enter into it, one could have said many things about the great advances which have been made in respect of colouring matters. We are certainly indebted to Germany. I sometimes think that our own commercial men allow themselves to be outstripped a good deal in these matters, that they do not study matters in time, and when one sees the vast arrangement that they have in Germany for making these colours, I am afraid we shall need to go

there for a long time yet to buy them. I would just like to add that it is to me a very great pleasure indeed to have been present this evening to do honour to our old friend, Sir William Perkin. (Cheers.) I think that he well deserves all the honours that have been given to him, and I can only hope that he will yet be spared to make many more researches and many more discoveries. (Cheers.)

SIR WILLIAM BROADBENT:—Mr. Chairman, your Highness, my Lords, and Gentlemen,—It is a far cry from the Coal-Tar Colour industry to medicine, and about the last thing I should have expected was to find my name associated with a toast of the Coal-Tar industry. But, after all, science rules, and to say nothing of the colours which Coal Tar has given us, of its enormous services in microscopic research, and of the fact that it is to Coal Tar that we owe most of our antiseptics, certainly the original ones, the research which began with the attempted synthesis of quinine has resulted in the endowment of medicine with remedies of considerable importance. But the most important thing that medicine owes to the Coal-Tar industry is the fact that for the first time it has been possible to predict from chemical constitution something of physiological action. This is a matter of the greatest possible importance, because in the long run all vital operations are chemical operations, and from what chemists have learned out of the study of molecules I think there is no doubt that, instead of merely seeking the synthesis of organic compounds, chemistry will reveal the secret of vital operations. Therefore I think that the prospective benefits that chemical science will confer on medicine, and through medicine on humanity, are perhaps more important than any yet arrived at. (Cheers.)

This concluded the toast list, and the company shortly afterwards separated.

The following telegrams were received during the Banquet:—

(From Prof. Chandler and Dr. Schweitzer, on behalf of American Perkin Committee, New York.)

“Perkin Jubilee, Whitehall Rooms, Greetings from America, long life and happiness to Perkin and family.—American Perkin Committee, CHANDLER, SCHWEITZER.”

(From Dr. C. A. von Martius, Berlin.)

“As one of the still living pupils and assistant of A. W. von Hofmann during his activity in England, and in grateful recognition of the most interesting and instructive olden time in which we had the opportunity of being fellow-labourers at the early development of the chemistry of artificial colouring matters, I send on your day of honour the heartiest and best congratulations, being only too sorry that a gouty attack prevents me from personally shaking hands with you.—C. A. VON MARTIUS.”

(From Geheimrath Prof. Dr. O. N. Witt, Berlin.)

“Dr. Perkin Jubilee Dinner. Heartiest congratulations, regretting my inability to be present on this memorable occasion.—WITT.”

(From the Society of Austrian Chemists, Vienna.)

“Dem Begründer der Anilinfarbenindustrie herzlichste Glückwünsche Verein Oestereichischer Chemiker.—WEGSCHEIDER, Präsident, SCRABEL, Geschäftsführer.”

(From Prof. Wallach, Göttingen.)

“Dem Hochverehrten Jubilar sendet herzlichste Glückwünsche WALLACH.”

(From Prof. Wilhelm Wislicenus, Tübingen.)

“Herzliche Glückwünsche zum heutigen Jubeltage sendet WILHELM WISLICENUS.”

(From Prof. Dr. Julius Bredt, Aachen.)

“ Dem altmeister organischer Farbstoffchemie—dem genialen Baumeister in der organischen Synthese—dem erfolgreichen Förderer chemische Wissenschaft und Industrie sendet zum heutigen Ehrentage herzlichsten Glückwünsche BREDT, Aachen.”

(From Prof. Dr. E. Knoevenagel, University of Heidelberg.)

“ Dem Begründer der Teerfarbenindustrie herzlichste Glückwünsche.—PROFESSOR KNOEVENAGEL.”

(From London Section, Society of Chemical Industry.)

“ Sir William Perkin, Sudbury, Committee and Members London Section Society Chemical Industry heartily congratulate you on so well-deserved an honour.”

(From Sir Lauder Brunton.)

“ Sincerest regrets for inability to be present. Heartiest congratulations. Best wishes for long life, health, and happiness.—LAUDER BRUNTON.”

In connexion with the Jubilee of the Coal-Tar Industry the following honorary degrees were conferred by English Universities upon distinguished pioneers in the domain of Colour Chemistry :—

BY THE UNIVERSITY OF MANCHESTER.

The honorary degree of D.Sc. upon Prof. Dr. Emil Fischer.

BY THE UNIVERSITY OF LEEDS.

The honorary degree of D.Sc. upon the following :—

Sir W. H. Perkin, F.R.S., LL.D., Ph.D., D.Sc., V.P.C.S.

Dr. Heinrich Caro, of Mannheim ;

Professor Albin Haller, of Paris ;

Professor C. Liebermann, of Berlin ; and

Dr. C. A. von Martius, of Berlin.

Celebration of Coal-Tar Jubilee in America.

In the autumn following the Jubilee celebrations in London, Sir William Perkin, in acceptance of an invitation extended to him by the American Committee, paid a visit to America, and was present at various gatherings held in his honour in New York, Boston, Washington, &c.

NEW YORK.

On the evening of October 6th a dinner was held at Delmonico's, at which about four hundred representatives of science, politics, and commerce were present. The chair was taken by PROFESSOR CHANDLER, who spoke feelingly of the pleasure it was to chemists, dyestuff and colour manufacturers, and their friends to have with them their honoured guest, and in this small way to do him honour for his great achievement. He also referred to the generous hospitality which had been extended to the American guests at the meeting of the Society of Chemical Industry held in London last year, when Sir William Henry Perkin was one of the committee in charge. Mention was made of the general fund which was being solicited for a chemical library to be installed at the Chemists' Club, and to be known as the Perkin Library. The speaker declared that at present there was not a complete library in the United States, and that it had been decided to establish this instead of a scholarship.

The CHAIRMAN then proposed a toast to the President of the United States, King of England, and Emperor of Germany.

The HON. PATRICK F. MCGOWAN, President of the Board of Aldermen, who represented his Honour George B. McClellan, gave the toast "Welcome to Our Distinguished Guest by the City of New York." He said :

"On behalf of his Honour the Mayor, the Hon. George B. McClellan, and the four millions of people of the city of New York, I extend to you a most cordial welcome. We are glad of the opportunity of demonstrating to you and your associates that hospitality is not confined to England and Englishmen, and this splendid gathering, assembled to do you honour, is but a slight evidence of our esteem and American hospitality. We congratulate you upon your success and rejoice in your good fortune.

"When our chemists and scientific men went to England they were met with open arms, they were *fêted* and feasted, and upon their return were loud in their praises of the treatment they received.

"Sir William Perkin, our hearts also are in our welcome to you."

DR. HUGO SCHWEITZER, secretary of the Committee of Fifteen, said :

I need hardly assure you how highly honoured I feel to be permitted to speak here to-night. Yet I am fully aware that the committee did not select me because it considered me the most competent of our chemists to respond to this subject, but because so many of our colleagues refused to be heard, fearing the arduous labour of condensing the vast material within the limits of a fifteen-minute address, when fifteen hours could be devoted to it with much less difficulty and work. With me, however, it was a labour of love, and I accepted with pride and pleasure, inspired by the wonderful development of this industry, in which I have been an attentive watcher and a modest co-worker. Above all, I have been inspired in my task by the genial personality and refined modesty of our distinguished guest, with whom I had the pleasure of becoming more intimately acquainted during last year's meeting of the

Society of Chemical Industry in London. It must be a sincere source of congratulation to us that he has braved the perils of a long ocean voyage to honour us with his presence at our celebration of the semi-centennial of the coal-tar industry. Only fifty years ago, while engaged in research, having for its object the artificial production of quinine, Perkin, then an 18-year-old assistant of Hofmann, obtained a muddy, dark precipitate, from which he first endeavoured to extract certain colourless crystalline substances which might adequately explain the reaction under observation. One day, however, the thought occurred to him to utilize this coloured precipitate itself for the dyeing of silk. It is hard to realize to-day what an epoch-making idea it was at that time to dye fabrics with a substance evolved in the laboratory and having no relation whatever to the dyestuffs then known. It was truly the spark of genius which led Perkin to investigate the dyeing properties of that dark-coloured precipitate which would have been cast away by any other scientist of that period, and particularly by his master, Hofmann, who objected to experimenting with anything which did not crystallize, and who had at that time a strong aversion to working with substances which were coloured. For the latter, when produced in reactions, were generally regarded as secondary products, and every endeavour was made to get rid of them, so that the other substances associated with them might be examined.

But however great the discovery of mauve, and however much we must admire the courage of the youth who undertook its technical production, yet these steps were only trivial incidents in the immense revolution brought about by Perkin's genius. The greatest obstacles encountered by him, and the most difficult task to be performed, were met when he attempted to sell the colour to dyers and printers. At that time men of this class worked by rule of thumb with secret recipes, mostly inherited from their forefathers, and these formulæ, although applicable to natural colours, were not suitable for mauve. Thus Perkin and his associates had to prepare new directions for dyeing and printing and to induce those ultra-conservative dyers to adopt the new methods. It has been almost forgotten that Perkin was the first to introduce the method of dyeing silk in a soap-bath, which is commonly employed to-day for all artificial dyestuffs, and that he and Pullar first made use of the insoluble inorganic compounds of tannin for mordanting cotton.

Thus the introduction of mauve completely changed the art of dyeing and printing, simplifying the processes and substituting for the old-time formulæ the scientific recipes furnished by the colour manufacturers of the present day. After Perkin had thus removed the obstacles in the path of practical application, it became comparatively easy to introduce other coal-tar colours.

But Perkin also paved the way for the discovery of the later coal-tar colours by making commercial products of aniline and benzol, which up to his time had only been laboratory curiosities. Of the three methods available for obtaining aniline he selected as the most promising the reduction of nitrobenzol, made by nitration of coal-tar benzol, and the production of aniline from this source led, shortly after the discovery of mauve, to the discovery of magenta, which opened up a new and immense field for this industry. Aniline from benzol was later found to contain toluidine, which is not present in aniline from indigo or that obtained directly from coal-tar, and Perkin truly said, in a lecture delivered December 7, 1868: "Had the aniline contained in coal-tar or the aniline obtained from indigo been employed for the preparation of mauve, instead of that prepared from commercial benzol, magenta and its train of coloured derivatives would in all probability have remained unknown to the present day from the simple fact that magenta cannot be produced from pure aniline, a second substance being also required."

The industry thus initiated with a violent impetus soon showed its revolutionizing tendencies and its vitalizing power in almost every branch of human endeavour.

To-day about 2,000 individual dyestuffs are known, giving the whole range of the colours of the rainbow, and complying with every demand of taste, fashion, and stability. They surpass in beauty and brilliancy the colours supplied by nature, and, contrary to the impression prevailing among the public, the shades obtained with some of them are faster to the influence of time, light, and chemicals than the fastest which nature produces.

The greatest triumphs of this branch of the industry was the artificial production of alizarin and indigo, and in the technical production of the former our distinguished guest has played a prominent part, solving the problem of its manufacture simultaneously with Graebe and Liebermann, whose English patent antedates that of Perkin by one day.

Coal-tar colours, however, are not only used for the dyeing of textile fibres, like wool, silk, cotton, linen, jute, ramie, &c., but for a host of other materials. Leather, paper, bones, ivory, feathers, straw, grasses are all coloured, and one of the most interesting applications is the dyeing of whole pieces of even the bulkiest furniture by dipping them in large tanks containing the dyestuffs, which transforms the wood into walnut, mahogany, at your command, as carried out in our big factories in Grand Rapids and elsewhere.

As coal-tar colours are used on this enormous scale, so they are also employed in a lilliputian manner, for staining specimens for examination under the microscope, enabling us to detect and identify bacteria, the finest nerve-ends and other minute elements of animal tissues, and by means of such staining methods, especially with methylene blue, Koch discovered the bacillus of tuberculosis and cholera, and initiated the modern battle against preventible infectious diseases. In reciprocation for the excellent reagents supplied him by the dye industry, the histologist brought about the discovery of a new and very important class of colours, and as this instance is one of the most striking demonstrations of the interdependence of practice and theory, I shall relate it to you. In 1886 Ehrlich observed that methylene blue and some of its congeners were the only colours which stained the living nerve tissue, and in order to determine whether this remarkable property was due to the peculiar constitution of methylene blue or to the presence of sulphur, he found it desirable to experiment with a substance analogous to methylene blue, but in which the sulphur was replaced by oxygen. He applied to Dr. Caro, requesting him to assist him in his work by furnishing him the material necessary for his experiments.

As a substance of this constitution was then unknown, it was made to order, and in the course of this research the valuable class of rhodamine colours was discovered. Thus experiments with nerve tissues gave birth to the manufacture of new coal-tar colours of the greatest importance in the textile industries.

The dyestuff merthylene blue and some others are also of great value as internal remedies, and the former is strongly recommended by one of the greatest American authorities for the relief of pain in that horrible disease cancer.

The medicinal properties of the coal-tar colours lead us to that branch of the industry which is next in importance—namely, the coal-tar remedies. Incidentally, it may be mentioned here that before these so-called synthetics were introduced Kolbe had succeeded in 1874 in artificially preparing salicylic acid, which up to that time had been exclusively a product of nature. Salicylic acid has been, and is still to-day, used extensively as a remedy against rheumatism.

The industry of synthetic drugs owed its origin also to the efforts of chemists to produce quinine artificially. Experiments had shown that by decomposing quinine a substance called quinoline was formed, and the latter was likewise found to exist in coal-tar. It was then assumed that quinine must in some way be derived from quinoline, and that perhaps other derivatives of quinoline might possess properties similar to quinine. This trend of thought led to the discovery of the quinoline derivatives,

thallin and kairin, which, however, were soon discarded on account of their drastic action, and only possess historical interest to-day.

In 1883 Knorr, starting from erroneous deductions concerning the constitution of quinine, and also misinterpreting the constitution of some of the products obtained in his research, inspired the pharmacological study of a substance afterwards called antipyrine. This proved to be of the greatest value in medicine, and was the first successful synthetic coal-tar remedy in the market.

Shortly after the introduction of antipyrine a fortunate accident gave this modern art an unexpected stimulus, diverting the investigation from quinine and uncovering an entirely new field. Kahn and Hepp, two physicians connected with the Strassburg University, were on terms of friendship with a chemist of the Hoechst Works, where Knorr's antipyrine was being manufactured, and requested him, in 1886, to send them some chemically pure naphthalene, which they desired to use internally in the case of a patient suffering from some skin disease. They received the substance, and on administering found that, while it failed to exhibit the expected effect, it promptly reduced the existing fever. When the supply of "naphthalene" was almost exhausted they wrote for a further quantity; but, to their great astonishment, the second supply, unlike the first, did not manifest any antipyretic action, and on comparing the two they soon discovered that a mistake had occurred somewhere. An investigation showed that when the first request was received the laboratory boy was directed by the chemist to fill a bottle with naphthalene and mail it to his friends, but through an error some acetanilide was sent instead, whilst the second time the chemist himself filled the bottle correctly. Thus, through an accident, acetanilide was introduced into medicine, a remedy which to-day is used by the ton as an antipyretic and anti-neuralgic, and through the irony of fate the most powerful competitor of antipyrine was discovered as the result of a mistake made in the very factory which was realizing enormous profits from the production of antipyrine.

When it was recognized that the acetylation of an amine produced a body of so much value, this process was tried with many amines and other suitable substances, and in consequence such important remedies as phenacetine were obtained, while by substituting lactic acid and glycine for acetic acid, lactophenin and phenocoll were prepared.

After chemical researches had shown that the active principles of vegetable purgatives, such as rhubarb, senna, cascara sagadra, and aloes, were anthraquinone derivatives, synthetic preparations of this class, which therefore are closely related to the alizarin colours, are now brought into the market. These new remedies have the advantage over the crude drugs of greater uniformity and exactness of action.

The active principle of the suprarenal gland, first isolated and investigated by an American scientist, a substance of surprisingly simple chemical constitution, has been obtained from coal-tar, and it is said that the synthetic product is now sold, and from experiments carried out in Europe and in the works of Parke, Davis, and Company in this country, we may expect that derivatives of it will soon appear which will be even superior in their pharmacological effect to nature's product.

About the time when the first synthetic remedies were brought out a very curious chemical substance was discovered which is to-day not only used for medicinal but also on a large scale for industrial purposes. I refer to saccharin, a substance derived from coal-tar, which is 550 times sweeter than sugar, and is the first representative of the class of artificial sweeteners. The history of this discovery is an interesting instance, showing how purely theoretical investigations may lead to the building up of an important industry. Dr. Fahlberg, working under the directions of Prof. Ira Remsen in the Johns Hopkins University, was experimenting with coal-tar derivatives from a purely scientific point of view. Before leaving the laboratory one evening he washed his hands, but was greatly surprised to find during his meal that his hands

had a sweet taste. The only explanation that he could think of was that, notwithstanding the thorough washing, he had brought some chemical along from the laboratory. Rushing back to it and carefully investigating the taste of all the goblets, glasses, and dishes standing on the working table, he finally came across one whose contents seemed to possess a remarkably sweet taste. What remained to be done was accomplished by later researches with this substance. He found very soon that saccharin, as the product was named, when diluted assumed the taste of cane sugar. The product seemed to be worthy of utilization, provided its other properties were not objectionable. Physiological experiments were now made on animals, and then on human beings, which showed that it was eliminated undecomposed, and that therefore the human organism behaved indifferently toward the substance. Furthermore, as no perceptible disturbance of the general condition could be observed, it could be assumed that saccharin had no deleterious influence whatsoever upon the general health.

With the introduction of this artificial sweetener a new industrial field was opened up, and the significance of this discovery can be easily imagined when you consider that four pounds of this material are equivalent in sweetening power to one ton of cane or beet sugar. It was soon manufactured on such a large scale that it seriously threatened the beet sugar industry of the Continent, and, as the latter was of much more economic importance, laws were enacted which prohibited the industrial use of the sweetener as a substitute for sugar, permitting its employment solely for medicinal purposes, the German Government even going so far as to make a sort of State monopoly of the manufacture of this material.

Still another industry has undergone vast changes through Perkin's discoveries, the manufacture of artificial perfumes. Nitrobenzol, under the name of Mirbane oil, was in the market as an artificial oil of bitter almonds even before Perkin's mauve. It was used to some extent for scenting soaps. To-day a great variety of synthetic perfumes are manufactured. The odour of musk is successfully imitated by a nitrated hydrocarbon derived from coal-tar; the odour of violets, of roses, of jasmine, of heliotrope, is reproduced artificially by synthetic substances, and the favourite American flavour, the oil of wintergreen, is manufactured from coal-tar. And in this art also the hand of the master is seen in what is called the Perkin reaction, through which he first succeeded in preparing from coal-tar coumarin and cinnamic acid.

The singular correlation of all those coal-tar products appears from the fact that the odoriferous principle of jasmine is derived from the same mother substance which furnishes synthetic indigo—namely, anthranilic acid.

Between the products giving the sweet odours of flowers and the death-dealing explosives there would seem to be a broad chasm, but not for the synthetic coal-tar chemist. In fact, the same nitrobenzol which was the first artificial perfume is used to-day with nitroglycerin as a safety explosive. The latter has the disadvantage of congealing when exposed to the cold and then becoming highly dangerous; the admixture of nitrobenzol keeps it liquid at very much lower temperatures. Trinitrobenzol and its analogues, especially trinitrophenol, or picric acid, are to-day employed as safety explosives by the miner and in proper mixtures as smokeless powder by the armies of the civilized world.

In conclusion, mention must be made of the use of coal-tar colours and preparations in the reproductive arts, in which they play a most important part. Inks for printing and writing are made with coal-tar colours, and in photography coal-tar preparations are now used almost exclusively for the development of the latent picture on films, plates, and paper. By the addition of certain coal-tar colours to the photographic emulsion the latter becomes extremely sensitive to light, and can then be used for instantaneous exposures, as in snapshots, and thus Kodak fiends are the direct

offshoots of the coal-tar industry. By means of coal-tar colours even one of the greatest of all problems, photography in natural colours, has been realized.

Curious to relate, with all these successes to its credit, the problem which has occupied the attention of master minds now for almost a century, and which was the incentive of Perkin's research, so fruitful in other fields, the artificial production of quinine remains unsolved up to the present day.

While thus new arts were constantly developed, the chemical industries existing at the time of Perkin's discovery were also eminently benefited. The production of aniline required at once large quantities of sulphuric and nitric acids for the nitration of benzol, and the demand of the new industry for highly concentrated sulphuric acid gave to the world the contact process. The manufacture of alizarin consumed enormous quantities of caustic soda. Bromine and iodine became staple articles of commerce. The electrolysis of salt solution was economically perfected, and, together with the contact process and the liquefaction of chlorine, is employed on an immense scale for the synthesis of indigo. The experience gained in electric methods is being applied to the problem of utilizing the nitrogen of the air, and to judge from past successes it will not be many years before the Badische Anilin und Soda Fabrik, in whose laboratories experiments in this direction are being conducted, will bring into the market nitrates, nitrites, and nitric acid made from atmospheric nitrogen, instead of Chile saltpetre, the supply of which is calculated to last no longer than about twenty years. And as Chile saltpetre is indispensable in agriculture, especially in the raising of cereals, its artificial production in the manner indicated will remove the anxiety expressed by writers on economics concerning the difficulty of feeding an ever-increasing population owing to the gradual exhaustion of the soil.

The distillation of coal-tar itself was changed in every respect to comply with the new development. All its by-products are utilized, and one of them, sulphate of ammonia, is produced so economically that it is commonly employed as a fertilizer.

The coal-tar industry gave us our modern chemical institutes, the wonderful equipments of which were first utilized in the laboratories of the factories, and, above all, it gave us the intimate co-operation of technology and science, which is, in fact, at the root of all this magnificent success.

Dr. William H. Nichols, past president of the Society of Chemical Industry, and president of the General Chemical Company, then presented to Sir William Henry Perkin the gold medal known as the Perkin Medal, which is its first impression, DR. NICHOLS said :

Rising to perform the agreeable duty which has been allotted to me, I feel that, even if unlimited time were accorded me, I should be unequal to the task. What then, shall I say in a few minutes what will in the most modest fashion do justice to this occasion? It has been said of a certain man that what he did not know would enrich a library. It may be said of our guest that an account of what he has done, together with what has grown out of it, would fill a thousand libraries, and yet, like John Brown's soul, "it still goes marching on." It is true that matter is indestructible; but so are great conceptions, and in a much broader and deeper sense.

Sir William, we are here to-night to honour you for your quiet life of unostentatious work. For half a century you have been patiently building—yes, better than you knew—with little thought of public reward or private gain, until at last you have come to your own. Honoured by your King, by your fellow-chemists, by the world, you may pass down the hillsides toward the setting sun with a clear conscience, and the assurance of the reward of him who has not been faithless to his trust. You have seen the dawn of the golden age—the age of chemistry—that science which by synthesis will gather together the fragments and wastes of the other dynasties, and build for the world a civilization which will last until the end.

Your American friends, therefore, are proud to recognize your works, and have in various ways attempted to show you how they feel, and at the same time make use of your example for the encouragement of others for all time. One of these ways has been the establishment of the Perkin Medal, to be given annually to the American chemist who has most distinguished himself by his services to applied chemistry. I hold in my hand the first impress of this medal, which it is my privilege to bestow upon you. On one side is a good likeness of yourself. On the other the words, "To Sir William Henry Perkin, from his American friends, for his distinguished services to the world," with the date. It is beautiful, like your character. It is many-sided, like your mind. It is of pure gold, like yourself. May you live long to enjoy its possession, and the pleasure of seeing the bestowal of many of its successors on worthy strivers after truth.

Mr. ADOLF KUTTROFF, Treasurer of the committee, then presented to Sir William Henry Perkin a tea service of eight pieces as a token of gratitude from his American friends. In presenting the service he said :

I have the honour of presenting to you, on behalf of your American friends and admirers, this service as a token of our esteem and in remembrance of this anniversary. It is a useful thing, to be used every day, and one of its objects is to remind you of your many friends in this country every time it is set before you.

The several pieces have inscriptions to commemorate some of your important scientific work. One piece has the legend,

" 1856 Mauve 1906."

Other inscriptions are :—

" The Technical Production of Alizarine."

" Anthrapurpurine."

" Perkin Reaction, Synthesis of Coumarin and of Cinnamic Acid."

" Constant Magnetic Rotary Power of Carbon Derivatives."

We express the fervent hope that you will use this service in good health for many, many years.

DR. WILLIAM FRANCIS HILLEBRAND, president of the American Chemical Society, presented the diploma of honorary membership of the American Chemical Society to the guest of the evening. Dr. Hillebrand stated that this society had a membership of over 3,000, and in June last unanimously agreed to confer this honorary membership, and cabled this fact to Sir W. H. Perkin and had received his acceptance, but had deferred the presentation of the same until the present function. He extended a most cordial welcome, and in closing gave to the guest the right hand of fellowship as a member of the American Chemical Society.

Other speakers who followed were :—

PROFESSOR NICHOLAS MURRAY BUTLER, President of Columbia University.

THE REV. S. P. CADMAN, D.D.

PROFESSOR HERMANN SCHUMACHER, University of Bonn.

DR. IRA REMSEN, President of Johns Hopkins University.

PROFESSOR NERNST, University of Berlin.

DR. H. W. WILEY,

and

COMPTROLLER H. A. METZ.

SIR WILLIAM HENRY PERKIN, in reply, said : It is now twenty-two years since I visited the United States. I was attending the first British Association meeting which was held at Montreal, and then extended my visit to Yellowstone Park, returning by Chicago, Washington, Baltimore, Philadelphia, New York, and Boston back to Montreal. At that time I certainly never anticipated that in twenty-two years' time I should be in this city at a jubilee celebration of the discovery of mauve and foundation of the coal-tar colour industry. It

was indeed quite unexpected, and a matter of surprise to me, when I heard that an international celebration was about to be inaugurated in my own country, which took place in July last. This included nations on both sides of the world, as you sent Dr. Baekeland as a delegate to represent America, but it was a great surprise to find that you were not satisfied merely to join the English Jubilee, but had determined to have a jubilee celebration of your own in this city, which I should be invited to attend. I can only say how greatly honoured I feel and how gratified I am at being present here to-night at this banquet, and meeting so many friends and fellow-workers in the field of science. From the very cordial and friendly reception you have given me I do not feel at all strange in coming amongst you, and especially as I realize how closely we are related to each other by race and language, which naturally engenders a strong feeling of sympathy between us, a feeling which has been so heartily manifested this evening by the warm welcome given by the city of New York through the Hon. Patrick McGowan, president of the Board of Aldermen, and also in a practical manner by the presentations made to me by Dr. Nichols, Mr. Kuttroff, and Dr. Hillebrand.

The foundation of a medal bearing my name to be annually awarded to an American chemist I feel to be a great honour, especially as I have all my life insisted on the importance of research work, and if this medal should help to encourage and stimulate some chemist to increased activity in this direction, this jubilee celebration will have accomplished a valuable result. I thank you very sincerely for presenting me with this beautiful medal, the first that has been struck, which I value very highly.

With respect to the beautiful personal token you have presented to me, I scarcely know how to express myself. I am sure it will be greatly valued not only by myself, but by Lady Perkin and my family. It has the merit of not only being beautiful, but also very useful, and it is a very suitable gift for a total abstainer.

I also appreciate very much the honour the American Chemical Society has done me in electing me one of its honorary fellows and presenting me with its certificate of membership this evening. I am very pleased indeed to have my name associated with this important society, the value of which I gauge from my knowledge of the help the London Chemical Society has been to me.

I very heartily thank Dr. Nichols, Mr. Kuttroff, and Dr. Hillebrand for all their kind and generous remarks in reference to myself when presenting me with these gifts.

That this Jubilee should also have another important object in view—namely, the foundation of a reference and circulating library for science, is a great satisfaction to me, as it may be the means of not only affording useful information to scientific workers, but also of stimulating research.

I am very glad that Prof. Chandler is the president to-night. I have known him for a long time, and we must all admire the indomitable perseverance with which he has worked for the cause of chemistry in this city for now over forty years, and for all the good work he has done. His position as chairman on this occasion is particularly fitting, because of the various ways in which he has been connected with the coal-tar industry, and his acquaintance with the great works in which the colours are made, and I also know the very hearty and active part he has taken in connexion with this celebration. I thank him also for the kind things he has said in reference to myself.

We have all listened with great interest to the remarks of Dr. Schweitzer, who is not only practically connected with coal-tar matters, but has also done good scientific work in connexion with them. I thank him for all the kind references he has made to me. And I take this opportunity of thanking him and all other members of the committee for all the pains they have taken to make my visit to this country so extremely pleasant and enjoyable not only to myself, but also to Lady Perkin and my

daughters. It is a landmark in our lives to which we shall always look back with pleasure.

I have no doubt that some of you will have read the particulars of the London celebration and what I said on that occasion, and this makes it difficult for me to address you, and if I repeat much of what I said then I must claim your indulgence, because one cannot but state the things which have occurred in one's lifetime; they cannot be varied. As I expect that many of you, however, may not be so well acquainted with the history of the coal-tar colour industry and the mauve dye which was its starting point as people are in the old country, I thought that you might like me to give a brief account of it, especially of its early days. Even to do this is difficult in the time at my disposal, and, moreover, as I shall have to speak about myself, it would have been more agreeable to me if some one else could tell the tale. To begin, it may perhaps first of all interest you to know something of my early days and how I became a chemist.

My father being a builder, the first idea was that I should follow in his footsteps, and I used to watch the carpenters at work and also tried carpentering myself. Other things I noticed led me to take an interest in mechanics and engineering, and I used to pore over an old book called the "Artisan" which referred to these subjects. I even tried to make an engine myself, and got as far as making the patterns for casting, but I was unable to go any further for want of appliances. I had always been fond of drawing and sometimes copied plans for my father, whose ambition was that I might be an architect. This led me on to painting and made me think I should like to be an artist, and I worked away at oil painting for some time. All these subjects I pursued earnestly and not as amusements, and the information I obtained, though very elementary, was of much value to me afterward; but when I was between twelve and thirteen years of age a young friend showed me some chemical experiments, and the wonderful power of substances to crystallize in definite forms, and the latter especially struck me very much, with the result that I saw there was in chemistry something far beyond the other pursuits with which I had previously been occupied. The possibility also of making new discoveries impressed me very much. My choice was fixed, and I determined if possible to become a chemist, and I immediately commenced to accumulate bottles of chemicals and make experiments. About this time I was sent to the City of London School, and to my delight found that lectures on chemistry and natural philosophy were given there twice a week. These I attended, and not long afterward the lecturer, seeing the great interest I took in the science, made me one of his lecture assistants, my duties being to prepare the experiments, arrange the table, and assist at the lectures. The dinner interval was the only time I had for fitting up apparatus and preparing for these lectures. The lecturer was Mr. Thomas Hall, B.A., one of the class masters, and he was very kind to me and helped me in every way. My father was disappointed at my choice, and the outlook for chemistry was indeed very poor in those days; but Mr. Hall had several interviews with him, and eventually I was allowed to follow my bent, and at the age of fifteen I left school and entered the Royal College of Chemistry in London, where Dr. Hofmann was professor.

Under Dr. Hofmann's able instructions I soon got through the ordinary course of qualitative and quantitative analysis and also gas analysis; this I looked upon only as a preliminary part of my chemical acquirements, and not, as many used to and some still do, as a full equipment. Research was my ambition, and under the professor's guidance this was entered upon and the first investigation completed when I was seventeen. I then became honorary assistant in Dr. Hofmann's research laboratory and helped to carry on his scientific inquiries, and in this way I quickly acquired a considerable insight into the chemical science of that day, as well as experimental experience. My time being much occupied with the professor's work, I had little opportunity of carrying on research on my own account.

I discovered "mauve dye" during the Easter vacation of 1856. I showed this dye to some of my chemical friends, who thought it might be valuable, but its evident costliness and the difficulties of preparing aniline for its production on a large scale made the probability of its proving of practical value very doubtful. At this time aniline was a very rare product, only found in a few research laboratories, and could not be purchased. Having obtained an introduction to Messrs. Pullar, of Perth, the well-known dyers, some pieces of dyed silk were sent to them, and they reported: "If your discovery does not make the goods too expensive, it is decidedly the most valuable that has come out for a long time." This report was very satisfactory except the "If" it commenced with. During the summer vacation, and with the help of my brother, Mr. T. D. Perkin, larger experiments were made, and consequently larger quantities of colouring matter obtained, and it was then decided to patent the process. But a difficulty arose. I was but eighteen years of age, and it was questionable whether a patent could be granted to any one under twenty-one (a minor). Counsel's opinion had therefore to be obtained, and this was to the effect that a patent being a gift from the Crown, the matter of age did not affect the grant. Further experiments were then made on dyeing and calico printing, and although the colours were admired, that terrible *if* respecting the cost was always brought forward, besides other questions. Nevertheless, I became persuaded in my own mind of the importance of the dye, and, as a consequence, I gave up my position as assistant to Dr. Hofmann that I might follow up the subject, but at this he was annoyed, probably thinking I was taking a false step. I was also much afraid that by entering into this technical pursuit my research work might be prevented, but I determined that so far as in me lay this should not be the case.

But the difficulty in starting this new industry was that no one was willing to come forward with the requisite capital, because they were not ready to risk it on such a new and untried product as this dye. My father, however, although he had been disappointed at my becoming a chemist instead of an architect, nevertheless had so much confidence in my judgment that he very nobly risked most of the capital he had accumulated by a life of great industry in order to build and start works for the production of this mauve dye. Time would fail me to enter into all the difficulties that beset the establishment of this "unique" industry, not only in having to invent suitable plant, but also to obtain even the raw material, which was not then made of a definite quality. The processes were quite different in character to those in existing chemical industries. The colouring matter also when made was quite different to ordinary dyes in its properties and methods for its application. In fact, it was all pioneering work. Nevertheless, the mauve was supplied for silk dyeing as early as December, 1857.

I have mentioned these particulars because the production of this new colour and the practical proof of the possibility of manufacturing it commercially was the foundation of the coal-tar colour industry. When the mauve was seen to be a success, of course every one commenced experimenting with aniline, and three years after its discovery magenta was discovered by M. Verguin in France. None of the difficulties I have mentioned were encountered in the manufacture of the latter dye; the way was clear, and all the processes for the application of the mauve were equally suitable for the magenta, and, moreover, none of the first prejudices in reference to such an innovation as the mauve any longer existed.

Other colouring matters were then discovered by myself, and in France by Messrs. Girard and Delaire, and by Dr. Hofmann in England, many of which were derivatives of magenta. These were produced not only in France, but largely in England by Messrs. Simpson, Maule, and Nicholson; they were also made to some extent in Germany and Switzerland, and very soon dyes of all the colours of the rainbow were obtained from commercial aniline, and the industry made very rapid progress.

In 1868 Graebe and Liebermann commenced an investigation on alizarin, the natural colouring matter of the madder root, from a purely scientific point of view ; this led to the remarkable discovery that this colouring matter is related to a coal-tar product called anthracene, from which they also succeeded in producing it. This was the first natural colouring matter which had been made artificially. Their process, however, was not suitable for the production of this colouring matter technically. Having in my research work studied anthracene and some of its products, I endeavoured to find a practical process for the formation of alizarin, and after a time succeeded in finding two suitable methods for its production on the large scale. Caro, Graebe, and Liebermann quite independently also discovered one of them. I and my brother then took up its production at our works (my father having died previously), but many difficulties were encountered, one being that of obtaining anthracene, which was not then a commercial product, but after visiting most of the tar works in England and instructing the tar distillers and agreeing to take what they could make, a supply was obtained, which quickly increased. In the meantime the difficulties of the manufacture were overcome, and we were soon able to commence supplying alizarin to the Turkey red dyers. In the year 1873 the demand for alizarin had so increased that we felt that it would be necessary to enlarge our works two or three times to meet the demand. My brother and I, however, did not care to undertake this great responsibility. We therefore sold our works, hoping our successors would follow up the matter.

This ended my connexion with the colour industry from a manufacturing point of view. After this I occupied myself with scientific research.

As I mentioned, when I started this industry I was determined not to give up scientific research, and so long as I had to do with it the part I took in its development resulted from the union of industry and scientific investigation. This has been followed up by others, especially in Germany, and owing to the work of an army of chemists, many of them men of great eminence and most of them engaged in the Works and their laboratories, this wonderful development, unequalled in the history of industry, has taken place.

This industry has also had a marvellous influence on the development of science itself. Its wonderful growth has also, as a matter of course, created not only directly but indirectly an immense amount of employment for men of all classes, especially for the working classes, and although America has not become a manufacturing centre for the production of these dyes, no doubt many thousands of American workers are engaged in the applications. That this industry which I was permitted to found should have led to this result is a source of pleasure to me, because the final result of our work should be the benefit of mankind.

You have been so good as to honour me by having this jubilee in remembrance of the part I have taken in connexion with this coal-tar colour industry, and whilst I am thankful that I had to do with its foundation and early development, yet I feel that the part I have taken is indeed small when compared with the labours of the army of scientific men and others, both inside and outside the colour works, who have advanced it to its present condition. At the same time it is very gratifying to me to receive all the generous and kindly expression of feeling you are manifesting, and I thank you very heartily. But what have I that I have not received ? It is not therefore for me to boast (and I feel that I have but imperfectly used my opportunities). I therefore can only say in reference to the successes which have attended my efforts :—" Not unto me, O Lord, not unto me, but unto Thy great Name be all the praise."

BANQUET IN BOSTON.

On the evening of October 11th a dinner was given in honour of Sir William Perkin at the Algonquin Club. Mr. Frederick E. Atteaux was in the chair, and he was supported by some 170 representatives of the dyestuff and chemical trades.

The CHAIRMAN expressed the pleasure he felt in welcoming Sir William, and hoped that the latter would carry back to England as pleasant memories of this visit as the speaker and others had brought back from a recent trip to England. He also spoke feelingly of the tie of kindred that bound so many Americans to the subjects of King Edward VII.

PROF. TALBOT, in proposing the healths of the President of the United States and the King of England, referred to Sir William's discovery of fifty years ago, tangible results of which were probably no more plentiful anywhere than in New England.

The next speaker, GOVERNOR CURTIS GUILD, Jr., extended to the guest of the evening " hearty greetings, good will, and a God bless you, sir," from Massachusetts, a State notable for the victories of peace as well as those of war, and the first textile State in the Union.

MAYOR JOHN F. FITZGERALD was unable to be present, and was represented by the Hon. Thomas A. Mullen. This speaker said that as the " hub of the universe " Boston spoke for the whole wheel in heartily praising the work of the evening's guest.

SENATOR HENRY CABOT LODGE said that, although hopelessly ignorant of the whole subject, he knew enough to appreciate the magnitude of Sir William's work. He told how he had felt years ago that it was a mistake to tax alcohol used in the arts. Such a manifest burden on industry was wrong. The possibility of using such alcohol to drink had stood in the way of withdrawing the tax until recently. The late removal of the tariff on denatured alcohol, however, would now enable us to avail ourselves, as never before, of the benefits of Sir William's invention.

CAPTAIN W. WYNDHAM, the British Consul at Boston, then spoke briefly. He was glad to have the opportunity to thank his hosts for their kindness to his distinguished fellow-countryman.

PRESIDENT HENRY S. PRITCHETT, of the Massachusetts Institute of Technology, then voiced the greetings of the institution of learning. He said :—

The wonder of Sir William's discovery to me is that as a young man of eighteen he was able to apply it so well. More than the invention of a great man is required for results in these days. We can learn from Germany that the organization of scholarship and business ability is needed. We must compel science and industry to go hand in hand.

MR. WILLIAM WHITMAN, president of the Arlington Mills, was the next speaker. He said :—

You know Sir William's contribution to society ; you are aware of his reward. The manufacturers of the world, and we of this commonwealth, owe him a debt which time cannot outlaw. The nations pay him tribute. There is no discordant note in the universal psalm of praise that must sound so pleasantly to his ears, the love and gratitude of his fellow-men. The spirit of genius that inspired our distinguished guest in his work is the attendant spirit of our print works, our dye houses, our chemical works, all kindred industries, and also of our seats of learning, with their extensive laboratories of research. It is the spirit of development that will watch over the progress of his great work.

We learn from him that the wonderful growth of that industry, which its originator has said should have as its net result the benefit of mankind, was due to the union of science and industry—scientific research with its discoveries and development of new ideas, and industry with its application of those ideas to material things for the benefit

of mankind. And then we note that the man who tells us these things was disturbed in his youth by the opinion prevalent in England that it was quite beneath a scientific man's dignity to be associated with industry. It is here, gentlemen, that I find my theme, for there is borne to our ears to-day a cry against "Commercialism," against commercial men, the men governing great industries which have, in my opinion, as their net result the benefit of mankind. The cry is perhaps an echo of that similar cry in England that disturbed our distinguished guest. Our scientific men, our men of learning, our preachers, and many other educated and intellectual men have expressed their fear of what they believe to be a great danger of modern times. This danger they have been pleased to call "commercialism." Recent unhappy revelations have increased these laments until the term "commercialism" is used as implying a taint.

To-night we have as our guest a man whose point of view it will be well for all to adopt, a man who realizes that the benefit of his lifework has been the fruit of the "union of science and industry," and who undoubtedly believes that the man of commerce and of industrial affairs is entitled to full credit for the part he has played in the development of that great industry. We, the manufacturers of Massachusetts, and all who are identified with what are called commercial interests, pay homage to learning and to science.

DR. W. H. WALKER then presented Sir William with a handsome silver punch bowl, inscribed with words of good wishes from the coal-tar and chemical interests of Boston. It had been the speaker's intention to review fully the results of Sir William's invention. The lateness of the hour caused him to refrain. He would say, however, that had it not been for this discovery the world would probably not yet have known the germ theory of disease. Here was a result in the foreign field of medicine.

SIR WILLIAM PERKIN then expressed his thanks for the beautiful gift and for the interest of those who had arranged this jubilee celebration.

After leaving Boston, Sir William Perkin and his party visited Washington, Baltimore, Philadelphia, Buffalo, Montreal, and Toronto, in all of which they received a hearty welcome from the professors of the Universities and others connected with science and industry. On his second visit to New York, Sir William Perkin received the honorary degree of Doctor of Science at the Columbia University. Dr. Chandler introduced him and Professor Butler conferred the degree, a considerable number of the Professors of the University and ladies being present.

At the University of Baltimore, he received the degree of LL.D., which was conferred by Principal Ira Remsen at a large special meeting in the McCoy Hall.



INTERNATIONAL COMMITTEE.

(N.B.—The countries are arranged alphabetically. The members of the Executive are marked with an asterisk.)

AMERICA.

- ACHESON, E. G., Vice-President American Electro-chemical Society, Int. Acheson Graphite Works, Niagara Falls, N.Y.
- AMEND, Otto P., of Eimer and Amend, New York City.
- APPLETON, John H., A.M., D.Sc., Professor of Chemistry, Brown University, Providence, R.I.
- ARNOLD, Edmund E., of Castner Alkali Co., Niagara Falls, N.Y.
- ATTEAUX, F. E., Esq., Boston, Mass.
- AUSTEN, Peter T., Ph.D., New York City.
- BAEKELAND, Leo, D.Sc., Past President of Chemists' Club, Yonkers, N.Y.
- BAKEWELL, Thos. W., Esq., New York City.
- BANCROFT, Wilder D., Ph.D., President American Electrochemical Society; Professor of Chemistry, Cornell University, Ithaca, N.Y.
- BARBER, Geo. F., M.D., LL.D., Professor of Chemistry, University of Pennsylvania, Philadelphia, Pa.
- BARNETT, Maurice, of Casein Co. of America, New York City.
- BASKERVILLE, Charles, B.S., Ph.D., Professor of Chemistry, College of the City of New York, New York City.
- BENJAMIN, Marcus, A.M., Ph.D., D.Sc., Smithsonian Institution, Washington, D.C.
- BIGELOW, Hon. John, LL.D., late Minister to France, New York City.
- BLOEDE, Victor G., Esq., Baltimore, Md.
- *BOGERT, Marston Taylor, M.A., Professor of Organic Chemistry, Columbia University, New York City.
- BRIESEN, Arthur von, Esq., New York City.
- BUTLER, Nicholas Murray, Ph.D., LL.D., Litt.D. (Oxon), President Columbia University, New York City.
- CARNEGIE, Andrew, Esq., New York City.
- *CHANDLER, Charles Frederick, Ph.D., M.D., LL.D., D.Sc. (Oxon); Professor of Chemistry, Columbia University, New York City.
- CHANDLER, William H., Ph.D., Professor of Chemistry, Lehigh University, Bethlehem, Pa.
- CHILDS, W. H., Vice-President American Coal Products Co., New York City.
- CHITTENDEN, Russell H., Ph.D., D.Sc., LL.D., Professor of Physiological Chemistry, Yale University, New Haven, Conn.
- CHOATE, Hon. Joseph H., LL.D., D.C.L., late Ambassador to England, New York City.
- CLAFLIN, Alan A., Esq., Secretary New England Section Society Chemical Industry, Boston, Mass.
- CLARKE, Professor Frank W., B.S., D.Sc., Chief Chemist, U.S. Geological Survey; Past President American Chemical Society, Washington, D.C.
- COXE, Hon. Alfred C., Justice 2nd U. S. Circuit Court of Appeals, Utica, N.Y.
- DENNIS, L. M., Ph.B., B.S., Professor of Chemistry, Cornell University; President Cornell Section American Chemical Society, Ithaca, N.Y.
- DICKERSON, Edward N., Esq., New York City.
- DOHME, A. R. L., Ph.D., of Sharp and Dohme, Baltimore, Md.
- DOREMUS, Charles A., A.B., A.M., Ph.D., M.D., New York City.
- EDISON, Thomas A., Esq., Orange, N.J.
- EDMONDS, Walter D., Esq., New York City.
- ELIOT, Charles William, LL.D., President Harvard University, Cambridge, Mass.
- ELLIOTT, Arthur H., Ph.D., Consolidated Gas Co., New York City.
- ENDEMANN, H., Ph.D., New York City.
- FAIRCHILD, Samuel W., Esq., of Fairchild Bros. and Foster, New York City.
- FAUNCE, William H. P., A.M., D.D., LL.D., President Brown University, Providence, R.I.
- FINLEY, John H., A.M., Ph.D., LL.D., President College of the City of New York, New York City.
- FRERICHS, F. W., Ph.D., of Merck and Co., St. Louis, Mo.
- *FRIES, H. H., Ph.D., of Fries Bros., New York City.
- FUERST, F. W., of Fuerst Bros., New York City.
- GAGNEBIN, C. L., Esq., of H. A. Metz and Co., Boston, Mass.
- GEISENHEIMER, Theodore, Esq., of Geisenheimer and Co., New York City.

AMERICA (continued).

- GIBBS, Wolcott, Ph.D., M.D., LL.D., Emeritus Professor of Chemistry, Harvard University, Newport, R.I.
- GIES, William J., Ph.D., Professor of Chemistry, College of Physicians and Surgeons, New York City.
- GIFFORD, Livingston, Esq., New York City.
- GOLDSCHMIDT, Dr. S. A., Columbia Chemical Works, Brooklyn, N.Y.
- GOMBERG, M., D.Sc., Professor of Organic Chemistry, University of Michigan, Ann Arbor, Mich.
- GRAY, William S., Esq., President Wood Products Co., New York City.
- GREF, Anthony, Esq., New York City.
- GROSSCUP, Hon. Peter S., Presiding Justice 7th U.S. Circuit Court of Appeals, Chicago, Ill.
- GUDEMAN, Edward, Ph.D., Chicago, Ill.
- HADLEY, Arthur Twining, A.M., LL.D., President Yale University, New Haven, Conn.
- HALL, Charles M., Esq., of Pittsburgh Reduction Co., Niagara Falls, N.Y.
- HARRIS, George, D.D., LL.D., President, Amherst College, Amherst, Mass.
- HARRISON, Charles C., A.M., LL.D., Provost University of Pennsylvania, Philadelphia, Pa.
- HART, Edward, Ph.D., Professor of Chemistry, Lafayette College, Easton, Pa.
- HASSLACHER, Jacob A., Esq., of Roessler and Hasslacher Chemical Co., New York City.
- HERRESHOFF, J. B. F., Esq., of General Chemical Co., New York City.
- HERTY, Chas. H., Professor of Chemistry University of North Carolina, Chapel Hill, N.C.
- HESSE, Bernhard C., Ph.D., New York City.
- *HILLEBRAND, Wm. F., Ph.D., Chemist U.S. Geological Survey; Past President American Chemical Society, Washington, D.C.
- HORN, David Wilbur, Professor of Chemistry, Bryn Mawr College, Bryn Mawr, Pa.
- HOWARD, Henry, Esq., Chairman, New England Section, Society Chemical Industry, Brookline, Mass.
- HUMPHREYS, Alex. C., M.D., LL.D., President Stevens Institute of Technology, Hoboken, N.J.
- ISAKOVICS, Alois von, Esq., Monticello, N.Y.
- JACKSON, Chas. L., A.M., Professor of Chemistry, Harvard University, Cambridge, Mass.
- JAMES, Edmund J., Ph.D., LL.D., President University of Illinois, Urbana, Ill.
- JAMESON, A. H., Esq., Branford, Conn.
- JAYNE, H. W., M.D., Ph.D., Philadelphia, Pa.
- JENNER, William A., Esq., New York City.
- JESUP, Morris K., A.M., LL.D., New York City.
- JORDAN, David Starr, M.S., M.D., Ph.D., LL.D., President Leland Stanford Jr. University, Cal.
- JUDSON, Harry Pratt, A.M., LL.D., Acting President Chicago University, Chicago, Ill.
- KINNICUTT, Leonard P., B.Sc., D.Sc., Professor of Chemistry, Polytechnic Institute, Worcester, Mass.
- KITTREDGE, Henry G., Esq., Editor, "Textile," Reading, Mass.
- KUNZ, Geo. F., Ph.D., of Tiffany and Co., New York City.
- *KUTROFF, A., Esq., New York City.
- LACHMAN, Arthur, Ph.D., San Francisco, Cal.
- LACOMBE, Hon. E. Henry, Justice of the 2nd U.S. Circuit Court of Appeals, New York City.
- LEVINSTEIN, Edgar, Esq., Boston, Mass.
- LIEBER, Hugo, Esq., New York City.
- LOEB, Morris, A.B., Ph.D., Professor of Chemistry, New York University, New York City.
- LOVE, E. G., Ph.D., Past President Chemists' Club, New York City.
- Low, Hon. Seth, LL.D., Ex-President Columbia University, Ex-Mayor of New York City, New York City.
- MCCAY, Leroy W., A.B., A.M., D.Sc., Professor of Chemistry, Princeton University, Princeton, N.J.
- *MCMURTRIE, William, Ph.D., Past-President American Chemical Society, New York City.
- MABERY, Chas. F., Sc.D., Professor of Chemistry, Case School of Applied Science, Cleveland, Ohio.
- MAC CRACKEN, Henry Mitchell, D.D., LL.D., Chancellor New York University, New York City.
- MALLETT, John W., Ph.D., M.D., LL.D., F.R.S., Professor of Chemistry, University of Virginia, Charlottesville, Va.
- *MATHESON, William J., Esq., Vice-President Cassella Colour Co., New York City.
- MATTHEWS, Jos. Merritt, B.Sc., Ph.D., Professor of Chemistry and Dyeing, Philadelphia Textile School, Philadelphia, Pa.
- *MERZ, August, Esq., of Heller and Merz, Newark, N.J.
- *METZ, Hon. Herman A., Comptroller of New York City, New York City.
- MEYER, Franz, Ph.D., of Metallurgical Company of America, New York City.
- MILLER, John A., Esq., President of Section of Western New York, American Chemical Society, Buffalo, N.Y.
- MOORE, Russell W., Ph.D., Appraiser's Stores, President New York Section Society of Chemical Industry, New York City.
- MORGAN, J. Pierpont, Esq., New York City.
- MORLEY, Edw. W., A.M., LL.D., Professor of Chemistry, Adelbert College; Past President American Chemical Society, Cleveland, Ohio.

AMERICA (continued).

- MUNROE, Chas. E., Ph. D., Professor of Chemistry, George Washington University, Past President American Chemical Society, Washington, D.C.
- MUURLING, I. J. R., Esq., New York City.
- *NICHOLS, William H., B.S., M.S., LL.D., D.Sc., President General Chemical Co., Past President Society of Chemical Industry, New York City.
- NOYES, Arthur A., S.B., S.M., Ph.D., Professor of Chemistry, Mass. Institute of Technology, Past President American Chemical Society, Boston, Mass.
- NOYES, William A., A.B., S.B., Ph.D., National Bureau of Standards, Secretary and Editor, American Chemical Society, Washington, D.C.
- OLNEY, L. A., Esq., Professor of Chemistry and Dyeing, Lowell Textile School, Lowell, Mass.
- PARKER, T. J., Esq., of General Chemical Co., Past President Chemists' Club, New York City.
- PARSONS, Chas. L., Esq., Professor of Chemistry, New Hampshire College, President North-Eastern Section, American Chemical Society, Durham, N.H.
- PENNOCK, J. D., Esq., of Solvay Process Co., Syracuse, N.Y.
- PLAUT, Albert, Esq., of Lehn and Fink, New York City.
- PORTER, Gen. Horace, LL.D., late Ambassador to France, New York City.
- PRITCHETT, Henry S., Ph.D., LL.D., President Massachusetts Institute of Technology, Boston, Mass.
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